

The Incomplete Guide to the

WILDLIFE OF SAINT MARTIN

BY MARK YOKOYAMA

Revised and expanded second edition with over 500 photographs in full-color



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THE INCOMPLETE GUIDE TO THE
**WILDLIFE OF
SAINT MARTIN**

REVISED AND EXPANDED SECOND EDITION

BY MARK YOKOYAMA

*O sweet Saint Martin's Land
So bright by beach and strand
With sailors on the sea and harbors free
Where the chains of mountains green
Variously in sunlight sheen
Oh I love thy Paradise,
Nature beauty fairly nice*

Father Gerard Kemps



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ABOUT SAINT MARTIN

St. Martin is an island of approximately 87 square kilometers near the top of the Lesser Antilles. It is part of an arc of older islands made from submarine volcanoes capped in limestone. It is hilly, but not mountainous, and supports a variety of biotopes (types of habitat), including mangrove wetlands, thorny scrub, and some secondary broadleaf forest.

St. Martin is a part of the Anguilla Bank, a group of islands that also includes Anguilla, St. Barths and the smaller nearby islets. These islands share an underwater foundation and have been connected into a single land mass during ice ages when the sea level was lower, most recently about 12,000 years ago.

St. Martin has been heavily impacted by human activity, and is one of the most densely populated islands in the region, with almost 900 people per square kilometer. Politically, it is divided into two parts, French Saint-Martin and Sint Maarten, an independent country in the Kingdom of the Netherlands. The island was inhabited, at least intermittently, by Amerindians as long as 3500 years ago, and was first settled by Europeans in the 1620s. The most recent era of development dates back to the 1950s and 1960s, when the island began to develop a tourism industry in earnest.

OUR UNIQUE FAUNA

Like any island, St. Martin has a unique assembly of fauna. For millions of years, animals have been arriving on the island by wing or by accident, and those lucky enough to survive have become the foundation of our island fauna. Over time, some have evolved into distinct species found nowhere else in the world. St. Martin, and the rest of the West Indies, can be seen as a series of natural experiments where scientists learn about animal dispersal and evolution. In turn, the animals and the relationships between them give us a window into the geological history of the islands themselves.

Animals have also arrived on the island with the help of humans, both on purpose and accidentally. These introductions probably began thousands of years ago with the Amerindians and have accelerated through the present day. Human-introduced species have a tremendous impact on the biology of the island.

Sadly, we have also lost species due to human activity and the animals we have introduced. Three reptiles are possibly extirpated on St. Martin, including one that lived only here and is now almost surely extinct. We will never know what insects or spiders the island may have lost before anyone had a chance to study them.

ABOUT THIS BOOK

This book was created to give an overview of the diverse fauna of St. Martin. While the island harbors a relatively small number of animals compared to North or South America, the total number of species is over a thousand and perhaps several times that. These are mostly invertebrates, mostly undocumented by biologists and may include many species currently unknown to science. A truly complete guide to the wildlife of the island would be impossible to create.

With that in mind, I have chosen a subset of creatures to include in this guide. To make the guide useful, you will find most of the animals that are commonly seen. To showcase the unique fauna of the island, I have included the species that are endemic to St. Martin or the surrounding area. I have also chosen strange and beautiful creatures that illustrate the surprising diversity of the island and the hidden treasures that await anyone who wishes to find them.

This guide is designed to be accessible to persons of all ages and backgrounds, while avoiding oversimplification. It is informed by both traditional research and my own field observations. I have endeavored to describe not just the animals themselves, but also their role and habits on this island. This book is also a book about St. Martin, and I have included local names, knowledge and histories whenever available. I have included numerous quotations from S. J. Kruythoff's 1938 book, *The Netherlands Windward Islands*, which is long out of print and features an excellent section on fauna. His observations tell much about the wildlife at that time.

THE SECOND EDITION

This second edition features significant changes. The text has been rewritten, and most of the photos are new. There are many new species included, as well as updates and corrections to the previous version. Over the past two years, various animals have been renamed and even discovered. Other errors in the first edition are my fault alone.

This new edition will itself become outdated as the island continues to change and the progress of science marches on. While I am much more confident in the accuracy of this edition, I will make the caveat that the identification of many of the invertebrates is provisional. Unlike birds or mammals, it is often impossible to make an absolutely certain identification of many insects and other invertebrates without microscopic evaluation by an expert in that exact type of animal or DNA analysis. Overall, the IDs in this section should be largely correct and as specific as I can make confidently.

I hope you enjoy this book and have a chance to experience St. Martin's wildlife firsthand. The wildlife of this island is literally unique and infinitely fascinating.

A FEW TERMS

Although this book is written as much as possible in plain English, there are a few words that may be unfamiliar to many people. **Endemic** is a term to describe the range of a species. For example, a lizard that only lives on St. Martin is endemic to St. Martin. A **bank of islands** is a group of islands that rest on the same submarine foundation with shallow water between them. An island bank is typically named after the largest island in the bank. The Anguilla Bank, for example, includes Anguilla, St. Martin, St. Barths and the smaller islets in the area. In many cases, islands in the same bank may have been connected during ice ages when the sea level was lower. **Extirpated** means locally extinct. A species could be extirpated on one island, but still surviving on others.

The **scientific name**, or binomial nomenclature, of an animal includes the genus and species names (followed by the subspecies, when applicable). Keeping with convention, scientific names in this book are italicized, and the genus is capitalized. When the same scientific name is used multiple times on a page, the genus is abbreviated. The abbreviations sp. and spp. are used for species and multiple species. For example, *Styloleptus* sp. would indicate one species of beetle that could not be identified past the genus. When referring to multiple species within a genus, for example, if a caterpillar feeds on a number of species of **Mimosa** tree, it appears as *Mimosa* spp.

A few other scientific terms that are specific to certain types of animals are used in the book. These are explained in the section introduction for that group of animals.

SAINT-MARTIN AND SINT MAARTEN

St. Martin is a land of many names. The island itself is typically called Saint Martin, which I use throughout the book. The Dutch part of the island is Sint Maarten, and the French side is written Saint-Martin.

Furthermore, the preferred local names for the two sides of the island are North and South. In many ways, the local terminology is preferable. It emphasizes the unity of the island, and reminds us that the island has its own unique character and heritage, independent of the European nations that colonized it. In this book, I use French and Dutch for the sake of clarity, both because they are more familiar to international readers and to avoid confusion with usage of the terms north and south as geographical terms.



BATS

Bats are the only native mammals living on St. Martin today. Bats are mammals from the order Chiroptera, which is highly diverse, and they are the only mammals who can truly fly. They were able to colonize St. Martin because of their flight. Mammals are endothermic (warm-blooded), and require a lot of energy to maintain their body temperature. While an animal with a lower metabolism, like a reptile, may survive a long overwater journey on a natural raft (like a fallen tree), a mammal is much more likely to starve before reaching land.

There are eight species of bats known on St. Martin, and each species has its own feeding and nesting habits. Our bats eat fruit, nectar, insects and even fish, and may be found in caves, trees or buildings. Bats play several important roles in the ecology of the island. They pollinate certain plants, disperse plant seeds and control insect populations.

Four of the eight bats are not pictured here. The **Lesser Antillean Long-tongued Bat** (*Monophyllus plethodon luciae*) primarily feeds on nectar, but may also eat fruits and insects. It may be found roosting in the cave on Billy Folly. The **Lesser Antillean Tree Bat** (*Ardops nichollsi montserratensis*) roosts in trees, primarily eats fruit and is found only in the Lesser Antilles. The **Brazilian Free-tailed Bat** (*Tadarida*

brasiliensis antillularum) is a small insectivore that roosts in a variety of places, most commonly in crevices in rock formations. The **Lesser Antillean Funnel-eared Bat** (*Natalus stramineus stramineus*) is extremely small and feeds on small insects. As can be inferred by the names of our bats, most of them are endemic to the region at the species or subspecies level, although most have close relatives in Central or South America. S.J. Kruythoff mentions the **Lesser or Common Bat**, which is probably the **Velvety Free-tailed Bat**, the **Leafnosed Bat**, which is probably **Jamaican Fruit Bat**, and the **Horseshoe Bat**.

PREHISTORIC MAMMALS

In prehistoric times, there were at least two native rodents, the **Blunt-Toothed Giant Hutia** (*Amblyrhiza inundata*), which may have been as large as 200 kg, and a much smaller, semi-aquatic **Rice Rat** (tribe Oryzomyini). It is thought that the hutia became extinct when rising sea levels separated St. Martin, St. Barths and Anguilla at the end of the last ice age, hence the name inundata. Oryzomyine remains have been found at Amerindian archaeological sites, indicating that it was probably still alive when the first humans came to the island.



Lesser Antillean Fruit Bat (*Brachyphylla cavernarum*)

This fruit-eating bat is found in most of the Lesser Antilles, as well as Puerto Rico and the Virgin Islands. It can be found roosting in large numbers in the Grotte du Puits cave in Terres Basses (photo opposite page). Above is a maternity colony with mothers and young bats that are still relatively hairless.

Flies from the family Streblidae can be seen above, particularly on the young bats. These flies are blood-sucking bat parasites that seem to have co-evolved with bats. Certain species of streblid may parasitize only one specific species of bat.



Jamaican Fruit Bat (*Artibeus jamaicensis*)

This bat is commonly found in caves on the island and primarily eats fruit. The species has a wide range, including most of the Caribbean as well as Central and South America. This bat has a prominent noseleaf, the wrinkled structure on the snout, which is thought to assist with echolocation.

These bats often bring fruit back to their roost, so it is not uncommon to find fruit seeds or pits on the floor of a cave where they are roosting.



Velvety Free-tailed Bat (*Molossus molossus*)

This small bat is an insectivore, and often roosts in buildings. If you are in an urban area of St. Martin and see bats, they are probably this species. They are most commonly seen around dusk and dawn. It may be considered a nuisance to have a colony nesting in one's roof, but they also play an important role in controlling insect populations, including mosquitoes, and perhaps reducing the incidence of diseases like Dengue Fever. A single bat may eat hundreds of insects per hour.

Also known as **Pallas's Mastiff Bat**, this species is found in South and Central America as well as the Caribbean.



Greater Bulldog Bat (*Noctilio leporinus*)

Also known as the **Fisherman Bat**, this bat uses echolocation to sense ripples on the surface of the water and then swoops down and catches the fish with its large feet. The calm waters of St. Martin's salt ponds are probably the primary fishing grounds for this bat. It may be seen at times in the upper recesses of the Grotte du Puits in Terres Basses.

The large jowls which resemble those of a bulldog are used to store food so the bat can continue fishing. Although I have not been close enough to experience it firsthand, this bat is reputed to give off a strong, fishy odor as a result of its diet.



INTRODUCED MAMMALS

While mammals have great difficulty colonizing islands on their own, they are often very successful and destructive when they do arrive. Humans have introduced a number of mammals to the island, both accidentally and on purpose, and those mammals have had, and continue to have, a severe impact on native species.

The first introduced mammals were rats and mice. They probably became established on St. Martin soon after the first Europeans arrived in the Caribbean, perhaps before the first colonists started living on the island. The adverse impact of rats in particular on island ecosystems has been well-documented. The mongoose was introduced to the island in 1888, primarily to control rats, which were an agricultural pest. The raccoon was documented on the island as early as 1957, although the origin of this species here remains a mystery.

Not pictured in this section are **Dogs** (*Canis familiaris*) and **Cats** (*Felis catus*), which live on the island in a spectrum from domestic to feral. They serve as predators to birds, reptiles and other small animals, and the easily accessible nests of seabirds and shorebirds are particularly vulnerable to them. Dogs are also known to disturb nesting sea turtles. S.J. Kruythoff lists a **Wild Cat**, which by 1938 was “now exterminated.”

Small Asian Mongoose (*Herpestes javanicus*)

Native to Asia, this mongoose has been implicated in the possible extirpation of the **Leewards Island Racer** (*Allophis rijgersmaei*), the **Lesser Antillean Iguana** (*Iguana delicatissima*) and **St. Martin's Skink** (*Spondylurus martinae*). They are also thought to suppress the population of the **Anguilla Bank Ameiva** (*Ameiva plei analifera*), restricting its range to urban areas that are avoided by the mongoose.

The mongoose was introduced to St. Martin in 1888, in an effort to control rat populations during the decline of the sugar cane industry. While rats and mice are a preferred foods of the mongoose, they readily adapt to other food sources, including birds, reptiles, invertebrates and even fallen fruits. Some studies have found that **Giant Centipedes** (*Scolopendra* spp.) may be a significant food source. To avoid a painful bite from the centipede, a mongoose will typically bite the centipede's head quickly and then toss it aside, repeating the process until the centipede is incapacitated. I have also seen groups of mongoose foraging for insects near animal carcasses.

Kruythoff notes it was brought from Guadeloupe, and it “has multiplied tremendously; has proved a detriment to poultry-yards, as well as a destroyer of birds and reptiles.”



Vervet Monkey (*Chlorocebus pygerythrus*)

The **Vervet** or **Green Monkey** is originally from Africa, but were introduced to St. Kitts, Nevis and Barbados in the late 1600s. The wild populations on St. Martin are presumed to be the descendents of escaped or released monkeys that were brought from St. Kitts as pets. On St. Martin, these monkeys are found in scrub and forest areas, including Pic Paradis, Bellevue, Guana Bay and Pointe Blanche. A wild monkey was sighted in 1974 by Andries Hoogerwerf, the earliest recorded sighting I have found on St. Martin. As omnivores, these monkeys pose a threat to birds, bird eggs, reptiles and other native animals. (Photo by Binkie van Es)



Raccoon (*Procyon* sp.)

This omnivore is rarely seen on St. Martin, as it is shy and nocturnal. First documented in 1957, it is possible that it was introduced by the Arawak, who were known to keep them as pets. Alternately, our raccoons may have descended from escaped or released pets during the 20th century. Perhaps in the future DNA testing will reveal the origin of our raccoon population.

While the animals themselves are rarely seen, their footprints are readily found in the mud near sources of water, and their distribution is probably island-wide.



Black Rat (*Rattus rattus*) and **Brown Rat** (*R. norvegicus*)

This pair of rat species has hitchhiked their way to almost every conceivable place on earth, and St. Martin is no exception. They are also found on the major satellite islands, including Tintamarre and Pinel.

A significant sugarcane pest, during the late 1800s there was a bounty of a bottle of rum offered in exchange for 100 rat tails. Rats are an ecological threat to nesting birds and native reptiles. S. J. Kruythoff refers to the **Gray Rat** and the **Bush Rat**, but is uncertain of the species. He says, "bush rats live, and build nests in trees."



House Mouse (*Mus musculus*)

The house mouse may indeed be found in houses on the island, including my own. It also lives in the wild on St. Martin, where I have seen it occasionally.

This mouse is known to compete with birds for seeds, and may eat small reptiles on occasion. Mice are considered a pest because they will gnaw their way into food packaging, and they can also be carriers of human diseases. Mice are eaten by birds of prey on the island, and I have found their bones in bird pellets on occasion.



DOMESTIC MAMMALS

While not wildlife per se, domestic mammals play an important environmental role on the island. Their grazing transforms the landscape and their impact is readily visible anywhere a fence separates close-cropped grazing land from undisturbed scrubland.

While most of these animals are managed by humans, they are often able to range over large areas of land. It is likely that there are some feral goat populations as well. **Wild Boar** on St. Martin are mentioned as early as 1658, and were present on the island through much of the 20th century. With the exception of pigs, livestock on St. Martin are herbivores, and their primary impact is their grazing. Overgrazing often leaves the topsoil exposed and open to erosion.

Livestock also impact the island in a variety of more subtle ways. The **Cattle Egret** uses them to increase their foraging efficiency, and dead livestock provide food for a variety of carrion-eating flies and beetles. Parasites, such as ticks, have also been brought to the island along with their livestock hosts.



PASTURE AND SCRUB

A sharp line is visible where a fence separates pasture from thorny scrub on a hill near Grand Case. Scenes like this are found throughout the island, and serve to remind us that thorny scrub, rather than open savanna, is the natural state of much of the island. In pasture areas, a few large trees are typically preserved, and they provide shade to livestock during the midday heat. In many cases, overgrazing is severe, leaving a landscape of stones where the topsoil has eroded away.



Domestic Goat (*Capra aegagrus hircus*)

The most common livestock animal on the island, these nimble grazers may be found practically everywhere. Each year the island celebrates the goat at I Love My Ram Day.



Domestic Sheep (*Ovis aries*)

The short-haired sheep of the Caribbean resemble goats, but may be easily distinguished by their long, hanging tails.



Donkey (*Equus africanus asinus*)

Donkeys were once an important tool for transporting goods and people. Today their numbers are much decreased.



Horse (*Equus ferus caballus*)

The majority of horses on the island today are kept for recreational horseback riding.



Cow (*Bos primigenius*)

Cattle were once an export product for St. Martin, although in small volumes and primarily for nearby islands.



Domestic Pig (*Sus scrofa domesticus*)

Rocheftort noted the presence of wild swine on St. Martin in the 1650s. Today, they are primarily kept in pens, and are one of the less noticable domestic animals on the island.



BIRDS

Birds are vertebrates from the class Aves. They have feathers and wings, are warm-blooded and lay eggs. They are the most diverse group of vertebrates on St. Martin because they are able to fly. Reptiles, for example, colonize islands slowly, often as the result of a series of chance events like a natural raft of vegetation set adrift in just the right currents to bring them to a new island. Birds are able to fly long distances between islands and continents. In fact, many migratory and overwintering birds essentially re-colonize St. Martin every year.

The number of bird species on St. Martin is still relatively low. Approximately 150 bird species have been documented on St. Martin, including domestic birds, escaped exotic birds and rare vagrants that have only been seen once or twice. However, this number continues to grow as new birds arrive to the island, and as scientists and birdwatchers find birds that may have gone previously unnoticed. In 1955, the ornithologist Karel Voous listed just 53 wild species known on St. Martin. By the time of their 1967 checklist, Voous and H.J. Koelers had noted 98 species, and surveys in the early 1970s by Andries Hoogerwerf increased the total to 111.

The birds of St. Martin include year-round residents, birds

that overwinter on the island, and others that pass through briefly in the spring and/or fall as they migrate between North and South America.

St. Martin offers many types of bird habitat. Our salt ponds, mudflats, mangrove wetlands and beaches are home to a variety of wading birds, herons and waterfowl. Seabirds fish in the seas surrounding the island and nest on the offshore rocks and islets. Our forests and scrublands are home to both native birds and overwintering songbirds from North America. Even our urban areas are home to a number of introduced species and those native species which are comfortable around humans.

Because birds are able to travel to and from the island, the bird populations of St. Martin have never been isolated from other populations and we have no native species unique to St. Martin. There are, however, a number of species or subspecies found only in the Lesser Antilles and these are featured in this section.

SEABIRDS

Seabirds are united not by their common ancestry, but by their habits and life histories. While they come from several different bird families, they have many things in common that allow them to thrive in marine environments. Seabirds tend to have more feathers than other birds, to protect them from the cold. Many also have salt glands to excrete the salt they ingest when eating and drinking. Most feed on fish and other marine animals, although different seabirds have different methods of catching their prey.

Seabirds also tend to be long-lived, and reproduce slowly, some only laying one egg per year. They often nest in colonies and typically favor remote sites that are safe from predators. These attributes make seabirds vulnerable to human activity. Their breeding habits make them slow to recover from hunting, and their nesting colonies, once safe and remote, may now be endangered by humans and introduced predators like rats and feral cats.

Seabirds may be pelagic or coastal. Pelagic seabirds spend the majority of time on the open ocean, and some may only return to land to breed. Coastal seabirds tend to fish in near-shore waters and roost on land. On St. Martin, many coastal seabirds are also found on our lagoon and salt ponds.

A number of our local seabirds are breeding residents who nest either on St. Martin or on the offshore rocks and islets that surround the island. Key seabird nesting sites on and around the island include Fort Amsterdam, Pelican Key, Molly Beday, Caye Verte and Tintamarre.

Not pictured in this section is **Audubon's Shearwater** (*Puffinus lherminieri*), locally known as **Wedrego**. Today this bird is rarely seen. It typically spends all day at sea, only returning to land after dark. Nesting sites have been found on Tintamarre in the past. Karel Voous, in 1955, wrote that it was "well known among the native people of all three islands [St. Martin, Saba and Statia], who told us without exception that the birds made very good eating."

ORNITHOLOGY ON ST. MARTIN

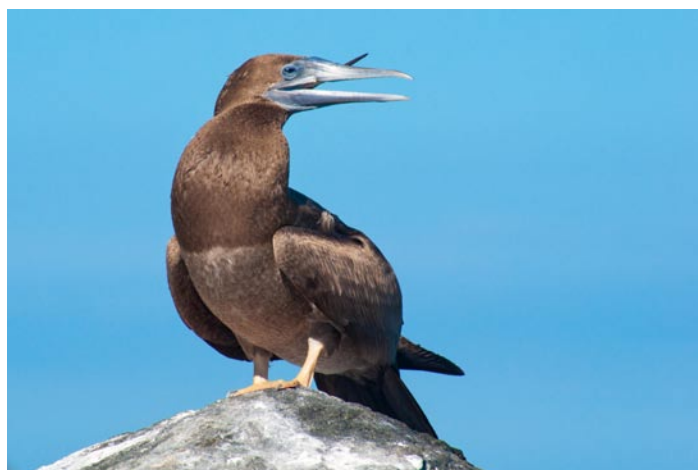
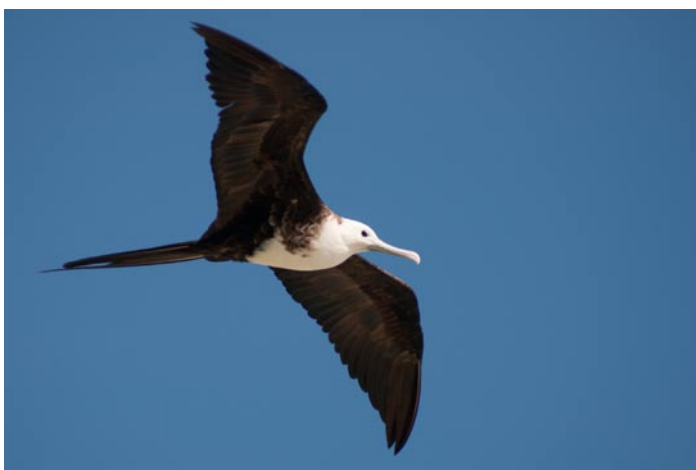
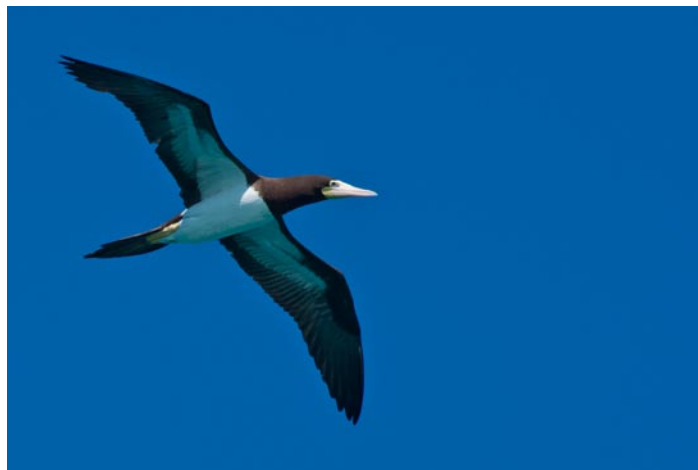
Several key works on the birds of St. Martin are referenced in this section. S.J. Kruythoff included many birds in his 1938 book about the Netherlands Windward Islands. Karel Voous published an extensive checklist in 1955, and Andries Hoogerwerf published another checklist in 1977 based on visits in the 1970s. Using the three detailed accounts from different times in the 20th century, we can understand how bird diversity changed on St. Martin during that time, and how local attitudes towards birds have changed.



Brown Pelican (*Pelecanus occidentalis occidentalis*)

The brown pelican is a large, distinctive seabird that is often seen fishing in the shallow waters of St. Martin's bays, beaches and ponds. Adult pelicans have white head, while juveniles (top of top photo) have a brown head and light belly. It is the national bird of Dutch Sint Maarten and is featured on their flag and coat of arms.

Brown pelicans are year-round residents of St. Martin, and may roost in large numbers in various locations, including Happy Bay, Étang Chevrise, Petite Clef and Fort Amsterdam. Known nesting areas include Fort Amsterdam and Pelican Key. Brown pelicans hunt fish, typically finding a school of fish from the air and diving into the water to catch them in their large bill. On the surface after a dive, they expel the water from their throat pouch and then swallow the fish they have caught. On St. Martin, they fish in both shallow near-shore waters and in our ponds and lagoon.



Magnificent Frigatebird (*Fregata magnificens*)

The magnificent frigatebird is known locally by a number of other names, including **Scissors Tail** and **Hurricane Bird**. According to S. J. Kruythoff, “Its appearance often heralds an oncoming storm.” It is a large bird, with a wingspan exceeding two meters. It is also particularly light for its wingspan, allowing it to remain aloft indefinitely, day and night, riding thermal air currents. It does not dive into or land on the water, but uses its long bill to catch fish on the surface.

The frigatebird is also known to steal food from other birds, often smaller seabirds, but I have seen it successfully steal a fish from a **Great Egret** (*Ardea alba*) as well. On St. Martin, the frigate may be seen gliding high above the coast, and groups may also be attracted to fishing boats where it scavenges the remains of fish being cleaned.

The male frigate looks all black, and its red throat pouch may or may not be visible (top). This pouch is inflated to attract females when breeding. Female frigates have a white patch on their chest and are otherwise dark. Juvenile frigates have a white head and chest (bottom). Even from a distance, frigates can be recognized by their large size and forked tails.

Brown Booby (*Sula leucogaster*)

The brown booby can be seen flying acrobatically near shore or following boats to catch flying fish or fish jumping from the boat’s wake. They dive into the water when fishing, and when there is a school of fish, they may sit on the surface, plunging their head into the water to make a catch.

Adult brown boobies are brown with a white bill and underside (top), while juveniles are all-brown with a gray bill (bottom). Boobies may nest on some of the offshore rocks near St. Martin, but better known nesting sites include Prickly Pear and Dog Island near Anguilla. Dog Island is estimated to host more than 1,000 breeding pairs. In 1938, Kruythoff noted that it “Nests on boulders and keys around the island.”

The juvenile in the photo above had attempted to swallow a needlenosed fish the wrong way (tail-first).

Also known from the island, but rarely seen, are the **Masked Booby** (*Sula dactylatra*) and the **Red-footed Booby** (*Sula sula*). The boobies are all part of the family Sulidae, which also includes the gannets.

GULLS

Gulls are seabirds from the family Laridae, and although there are a number of species known from the island, the only one that is commonly seen is the **Laughing Gull** (*Leucophaeus atricilla*), also known locally as the **Laughing Bird**. This gull is a summer visitor, typically seen May through October, where it is presumably vacationing from the South American winter.

It is interesting to note that in 1938, the author S.J. Kruythoff noted that it “arrives in dense flocks in Sept. and Oct. They cover the ponds and become very disagreeable with their laughing cry.” If this was true, it is possible that the laughing gulls on St. Martin during this time came from North America. By 1974, Andries Hoogerwerf noted that the laughing gull was very rare in the winter, as it is today.

Laughing gulls are known to nest on Pelican Key, and may nest on other offshore rocks. During the summer months they may congregate in large flocks on the seashore, the salt ponds, and the municipal dumps, where they scavenge for food.

Several other gulls visit the island in small numbers. They include the **Ring-billed Gull** (*Larus delawarensis*), the **Lesser Black-backed Gull** (*Larus fuscus*), the **European Herring Gull** (*Larus argentatus*), the **Black-headed Gull** (*Chroicocephalus ridibundus*) and the **Smithsonian Gull** (*Larus smithsonianus*).



Laughing Gull (*Leucophaeus atricilla*)

Summer plumage for the adult laughing gull includes an easily recognizable black head. Their bill is typically red or partially red.



Laughing Gull (*Leucophaeus atricilla*)

This juvenile laughing gull has plumage that resembles the winter plumage of the adult. These gulls take three years to gain their adult plumage.



Lesser Black-backed Gull (*Larus fuscus*)

This juvenile was seen at the Great Salt Pond in early spring. Missing some flight feathers, it may have been off-course from the typical migration between Europe and the USA.



Laughing Gull (*Leucophaeus atricilla*)

Several gulls from a larger flock have congregated around a tide-pool area to forage for food and bathe.

TROPICBIRDS

The **Red-billed Tropicbird** (*Phaethon aethereus*) and **White-tailed Tropicbird** (*Phaethon lepturus*) have both been recorded on St. Martin, although the red-billed tropicbird is the one seen regularly today. These birds are typically seen flying around seashore cliffs, particularly around Tintamarre and The Lowlands/Terres Basses. These cliffs are their preferred nesting areas. The nearby island of Saba is thought to host perhaps 1,000 breeding pairs, making it one of the most significant breeding areas in the region. A handful of white-tailed tropicbirds were seen near Beacon Hill in February, 2013.

Tropicbirds are easily recognized by their long tail feathers, and in French they are called **Paille en Queue**, meaning straw-tail, or **Paille en Cul**, which is very similar in meaning, but a shade less raffiné. Other local names recorded by Karel Voous include **Trophic** and **White Bird**.

The red-billed tropicbird was first collected on the island in the 1860s by Dr. Hendrik van Rijgersma, and was reported by Voous in the 1950s. In the early 1970s, Andries Hoogerwerf failed to find it, but did find the white-tailed tropicbird, particularly around Cupecoy, where it was nesting.

Although neither tropicbird is currently considered threatened, local populations are small. Rats and goats on Tintamarre are a threat to breeding success, with rats preying on eggs and chicks and goats trampling nests.

Tropicbirds are currently classified in their own family (Phaethontidae) and order (Phaethontiformes), with no known close relatives.



Red-billed Tropicbird (*Phaethon aethereus*)

An adult tropicbird approaching its nest on a cliff at Tintamarre.



Red-billed Tropicbird (*Phaethon aethereus*)

This nesting bird is covered in ants, which may be a sign of nest predation. The remains of a dead chick or broken egg would attract ants to the nest.



Red-billed Tropicbird (*Phaethon aethereus*)

This bird is easily identified by its bright red bill and long, white tail feathers. The white-tailed tropicbird is smaller, has a yellow bill and no black barring across its back.



Red-billed Tropicbird (*Phaethon aethereus*)

Immature red-billed tropicbirds have a yellow bill, which may cause some confusion in distinguishing them from the white-tailed tropicbird.

TERNs

A number of terns, family Sternidae, are known from St. Martin. They are acrobatic in flight and often seen fishing in-shore waters. Most of St. Martin's terns are migratory visitors, although a few are known to nest here, at least historically.

Not pictured here are the **Gull-billed Tern** (*Gelochelidon nilotica*), **Bridled Tern** (*Onychoprion anaethetus*), **Sooty Tern** (*Onychoprion fuscatus*), **Forster's Tern** (*Sterna forsteri*) and **Common Tern** (*Sterna hirundo*) and **Brown Noddy** (*Anous stolidus*). Of these, the sooty tern and brown noddy have historically bred on Pelican Key.

Tern nests on St. Martin are highly vulnerable to predation. During a recent survey of sixteen nests on Caye Chateau I found all the nests destroyed and the colony abandoned within two weeks.



Roseate Tern (*Sterna dougallii*)

This tern has a long, forked tail and is otherwise similar in appearance to Forster's tern and the common tern. It has been known to breed on St. Martin in small numbers.



Royal Tern (*Thalasseus maximus*)

Our largest tern can be identified by its bright orange bill and the black crest on its head. It is known to breed on Pelican Key.



Least Tern (*Sternula antillarum*)

The least tern is much smaller than our other terns, about 23 cm in length. They are often seen around our salt ponds and near-shore waters.



Cabot's Tern (*Thalasseus acuflavidus*)

Formerly known as the **Sandwich Tern** (*T. sandvicensis*), the New World population of this tern is now thought to be a separate species.



Least Tern (*Sternula antillarum*)

Least terns nest in colonies at Grand Étang, Salines d'Orient and Caye Chateau. They lay eggs on the ground on beaches and mudflats, making them vulnerable to predators.



SHOREBIRDS

Also called waders or wading birds, the term shorebirds typically refers to birds from the family Charadriiformes, excluding gulls, terns and other seabirds. St. Martin offers a wide variety of habitats for these birds, including our beaches, rocky coastlines, mangrove wetlands and mudflats. Accordingly, we host a great diversity of shorebirds.

While some species are year-round or overwintering residents, the greatest numbers are seen in April-May and September-October when many of these birds are migrating between North and South America. St. Martin during these months is an important stopping point during a journey that may be over 20,000 kilometers round-trip. In this way, St. Martin is connected to bird populations spanning the Western hemisphere.

In 1938, S.J. Kruythoff gave the migratory period as “towards the middle of November” and described it in this way:

Swallows dart across the sky in hundreds, late in the year, pursuing the insects which buzz through the bracing November air. Ducks and other waterfowl skim along our ponds or hide themselves in the thickly matted brushwood skirting these waters.

Most of these birds feed on invertebrates, such as snails and crustaceans, living in sand, mud or shallow water. They often have long legs and bills, and can be seen foraging for food on our beaches and wetlands. The preservation of these habitats helps insure the success of our local residents and our migratory visitors. Anyone familiar with these birds from North or South America, may notice that most of the shorebirds on St. Martin wear their non-breeding plumage. In some cases, the difference is striking. Generally, non-breeding plumage is less distinctive.

The shorebirds species recorded on St. Martin, but not pictured here are: **Snowy Plover** (*Charadrius nivosus*), **American Golden Plover** (*Pluvialis dominica*), **Collared Plover** (*Charadrius collaris*), **Sanderling** (*Calidris alba*) **White-rumped Sandpiper** (*Calidris fuscicollis*), **Western Sandpiper** (*Calidris mauri*), **Pectoral Sandpiper** (*Calidris mauri*), **Long-billed Dowitcher** (*Limnodromus scolopaceus*), **Marbled Godwit** (*Limosa fedoa*), **Wilson's Phalarope** (*Phalaropus tricolor*), **Ruff** (*Philomachus pugnax*), **Buff-breasted Sandpiper** (*Tryngites subruficollis*) and **Solitary Sandpiper** (*Tringa solitaria*). Many of these are rare visitors, and a few are known from a single sighting on the island.

PLOVERS

Compared to most other shorebirds, plovers have relatively short bills. Rather than probe the sand or mud with a long bill to find food by feel, they spot insects and other food by sight. The plovers on St. Martin include both migratory visitors and year-round breeding residents. They are typically found on beaches and mudflats, although the killdeer is found in pastures, roadsides and a variety of other habitats.

Plovers nest on the ground, usually making a small depression and lining it with a few bits of shell or rock. To protect these vulnerable nests, the parents often put on elaborate displays to distract predators. They may feign injury, make loud alarm calls and pretend to sit on a nest where there is none. This last technique is known as false brooding.



Semi-palmated Plover (*Charadrius semipalmatus*)

This small plover overwinters on the island, and is seen in greater numbers during the fall and spring migrations.



Wilson's Plover (*Charadrius wilsonia*)

This plover's long, thick bill is distinctive. It breeds on the mudflats that surround some of St. Martin's salt ponds. The population here is in decline, perhaps due to nest predation.



Killdeer (*Charadrius vociferus*)

Known locally as the **Soldier Bird**, it is a common breeding resident here. Adults put on a distracting show to defend their nests, including the old "broken-wing" act.



Black-bellied Plover (*Pluvialis squatarola*)

Known as the **Grey Plover** in Europe, it is St. Martin's largest plover. In non-breeding plumage it does not have a black belly, but does have a black patch under the wings in flight.



Killdeer (*Charadrius vociferus*)

Newly-hatched killdeer are able to walk almost immediately, an important skill, as their nests are on the ground. They typically hide while their parents attempt to distract predators.

SANDPIPERS

Sandpipers are a large and diverse group of shorebirds in the family Scolopacidae. None of our sandpipers typically breed on St. Martin, or in the Caribbean. They are most common during migration, but many are present in smaller numbers during other months.

Most sandpipers feed by probing mud or sand for insects, crustaceans, worms, snails or other invertebrates. Some species, like the yellowlegs, use their bills to catch fish in shallow water. They typically have long bills, some exceptionally so.

Some of these birds have been hunted for food on St. Martin. In his 1938 book, S. J. Kruythoff remarked regarding the whimbrel: “The best time for hunting these curved-billed birds is at sunrise at the water’s edge.”



Stilt Sandpiper (*Calidris himantopus*)

Relatively large, this sandpiper has a long, thick, black bill and dull yellowish legs, which are quite long. It is not common here, but may be seen at any time of year.



Semi-palmated Sandpiper (*Calidris pusilla*)

This small sandpiper is extremely common on the island during the spring and fall migratory seasons. It looks similar to the **Least Sandpiper**, but has a black bill and legs.



Spotted Sandpiper (*Actitis macularius*)

Not spotted in its non-breeding plumage, this sandpiper bobs its tail up and down almost constantly. It catches insects on the mudflats with lightning speed.



Least Sandpiper (*Calidris minutilla*)

The least sandpiper is our smallest sandpiper. It is common during the migratory season and smaller numbers spend the winter on the island.



Short-billed Dowitcher (*Limnodromus griseus*)

Very common during the migratory seasons, it can be found here year-round. Short and stocky, it has a long, thick bill that is black at the tip and brown near the base.



Ruddy Turnstone (*Arenaria interpres*)

Most common on beaches and rocky shoreline, this bird has bright orange legs and a dark swirl on the breast. Some have leg bands from scientists tracking their migration.



Hudsonian Whimbrel (*Numenius phaeopus*)

The whimbrel is the largest sandpiper on the island, with a distinctive curved bill. Overhunted here and elsewhere, it is relatively uncommon today.



Greater Yellowlegs (*Tringa melanoleuca*)

The two species of yellowlegs, both known locally as **Yellowlegs**, are very similar in appearance. Of course, the greater yellowlegs is larger.



Willet (*Tringa semipalmatus*)

The willet is large, with a thick, black bill. It is a relatively uncommon visitor to this part of the Caribbean. It is closely-related to the yellowlegs, but quite different in appearance.



Lesser Yellowlegs (*Tringa flavipes*)

Both yellowlegs have long, bright-yellow legs and long, thin bills. They may be seen throughout the year. Their primary food is small fish caught in shallow water.



Wilson's Snipe (*Gallinago delicata*)

Famed for its ability to stay hidden (hence the term “snipe hunt”), they often forage unnoticed in roadside ditches or grassy wetland areas of the island.

STILTS

The **Black-necked Stilt** (*Himantopus mexicanus*) is the only member of the family Recurvirostridae on the island. Strangely, it was not recorded on the island until 1955 and considered rare until at least the 1970s. Today, this bird is quite common on our salt ponds, and can be seen in groups ranging from a handful to over 100.

Easily identified by its black and white plumage and long, pink legs, the stilt also makes loud and continuous alarm calls when approached. The stilt nests on the island during the spring, on mudflats and on the remaining stone walls that separated the salt pans on the Great Salt Pond. Their nests are often vulnerable to changes in the water level, but once they hatch, the chicks are mobile within hours.



The nest of a stilt is more elaborate than some shorebirds, and may be made of sticks, small stones, or whatever is available. Several greenish-brown eggs with black spots are incubated for about three weeks.



The black-necked stilt feeds by probing the mud, but may also pass its bill back and forth in shallow water to find small invertebrates to eat, as seen in this photo.



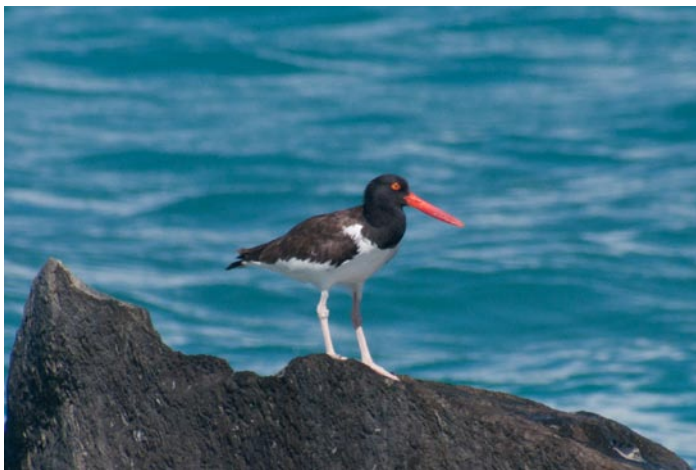
Young black-necked stilt chicks are capable of running or even swimming, but typically rely mostly on camouflage to avoid predators.



Nesting stilts, or those with young chicks will put on elaborate displays to distract predators. These displays include loud cries, feigned injury and even dive-bombing predators (or photographers) that approach a nest.



Older juvenile stilts are similar in appearance to adults, but typically gray rather than black. It is not uncommon to see families of two adults and one or more juveniles together.



American Oystercatcher (*Haematopus palliatus*)

The American oystercatcher is the only member of the family Haematopodidae on St. Martin. This small family includes only about a dozen species in a single genus. Locally, this bird is known as the **Whelk Cracker** due to its preference for this type of sea snail.

The oystercatcher is not common on St. Martin, but may be seen in couples or small families along rocky coastlines where it uses its strong bill to open mollusks. The adult, seen above, has a bright, orange-red bill. Juveniles are similar in appearance, but their bill is dark at the tip (lower photo).

In our part of the Caribbean they are typically considered rare, but they may be seen throughout the year on St. Martin, and perhaps they even breed here in small numbers.



SHOREBIRDS AND SARGASSUM

During April-May and September-October, many shorebirds are migrating between North and South America. A portion of these stop in St. Martin each year, feeding on our seashores and salt ponds, often in mixed flocks of hundreds or even thousands of birds.

In recent years, St. Martin's eastern coastline has at times been covered in sargassum, a type of free-floating alga that is typically found in the middle of the North Atlantic, in what is known as the Sargasso Sea. While the exact chain of events that has led to abnormal amounts of sargassum in the Eastern Caribbean is unknown, it is likely due to changes in ocean currents, which in turn may be the result of climate change.

The sargassum on our beaches is considered unsightly, and the smell of hydrogen sulfide it emits while decomposing is unpleasant. For shorebirds, however, it provides an abundance of food. Tiny shrimp and other crustaceans arrive with the floating seaweed, and small shorebirds land on the floating mats of sargassum to forage there. On shore, the sargassum provides food for insects and other invertebrates that are in turn eaten by the birds.



EGRETS AND HERONS

Egrets and herons are medium to large birds with long necks and legs, and are from the family Ardeidae. The terms egret and heron don't have any biological significance, and egret is typically used for birds from this family with predominantly white feathers.

The taxonomy of this family is somewhat uncertain, and it is possible that some of the scientific names will change if scientists are able to better understand the relationships between the various species.

In St. Martin, the majority of these birds are found in and around our salt ponds. They are carnivorous, and most species hunt a variety of aquatic prey. Almost all the species on St. Martin are permanent residents who nest here.

A number of these species are known locally as **Gaulin**, often with an adjective to distinguish the species, such as **Night Gaulin**, **Little Gaulin**, etc. It may also be spelled **Gawlin**. The etymology is unclear, but similar names are used in much of the Caribbean.



A GIVING TREE

This series of photos, from 2010, 2012 and 2013 illustrates the death of a mangrove tree that was a popular roosting site for our three egret species. In just a few years, this healthy tree was dead, presumably due to the rigors of supporting so many nests. With many former mangrove areas reduced in size, remaining mangroves may be overburdened by the local egret population. It seems that this nesting site is so desirable it will remain in use until the last branches collapse into the pond.



Great Egret (*Ardea alba*)

The great egret is very large, with a thick, yellow bill and long black legs. In its white phase, which occurs only rarely in the region, the **Great Blue Heron** looks quite similar, but has yellow legs.

This species did not appear on an official list of St. Martin birds until 1974, which is a bit surprising, since it is relatively common today. However, S. J. Kruythoff had noted them in 1938. In many areas, it was hunted for its feathers during the 1800s, so perhaps it was hunted out of existence here and only managed to reclaim this part of its range during the 20th century.

Great egrets build large nests of twigs, often on mangroves in the water or at the water's edge. They typically nest in colonies, and often with other egrets or herons. They have a loud, guttural call.

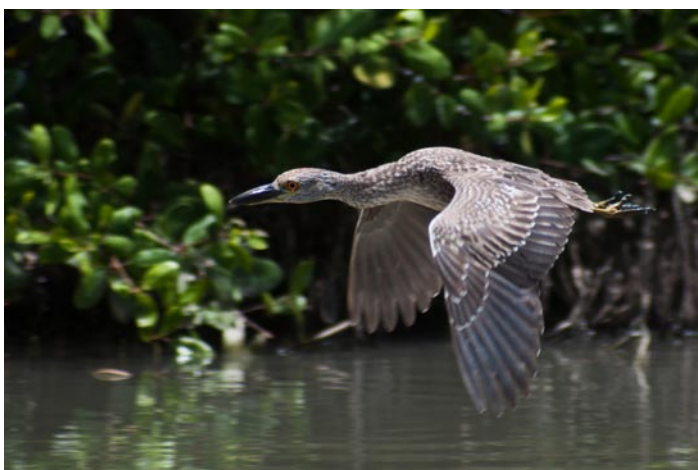
When hunting, this egret often remains motionless in shallow water until suddenly striking, spearing fish with its bill. It may also eat frogs, lizards or insects if the opportunity arises.

Snowy Egret (*Egretta thula*)

This egret is medium-sized, with a black bill and black legs and yellow feet. Immature birds also have yellow stripes up the back of their legs. During the breeding season, it has long plumes on its head and back.

Much like the **Great Egret**, this bird was extensively hunted for its feathers, and has since recovered. The first official record on St. Martin seems to be 1952, when it was thought to be a non-breeding visitor. Once again, Kruythoff had previously documented its presence on the island. When creating his 1955 checklist, Karel Voous rejected eleven species recorded by Kruythoff due to "lack of evidence." Since then all eleven species have been found on the island.

Today the snowy egret is quite common and is often seen hunting on our salt ponds and shallow water near-shore waters. They nest in colonies, typically on mangroves and may be found nesting with the great egret and the **Cattle Egret**. One mangrove tree in the Étang du Cimetière died over the course of several years after hosting dozens of nests of these three species.



Yellow-crowned Night Heron (*Nyctanassa violacea*)

This heron is relatively stocky, with a thick bill. Adults are gray with a black head and white stripes on the cheek and the top of the head. Juveniles are a mottled brown, but similar in shape. Both have orange-red eyes.

Local names for this bird include **Night Gaulin** and **Crab-eater**, and this bird is primarily nocturnal and does specialize in eating crabs. During the day, it may be seen hiding in shady areas near the edge of a pond or drainage ditch. The adult above was seen doing a series of strange, yoga-like poses for several minutes. Some biologists hypothesize that this is done to kill parasites by exposing them to the sun. Others consider this explanation highly improbable. The true purpose of this activity remains, for now, a mystery.

S. J. Kruythoff remarked in 1939 that they were “very much pursued as game.” Today, they are relatively common, though perhaps not frequently seen due to their habits. I have found a number of nests of this species in the trees and shrubs on Pinel Island and Petite Clef.

The similar **Black-crowned Night Heron** (*Nycticorax nycticorax*) is seen on St. Martin much more rarely. It has a white underside and black back and crown.

Little Blue Heron (*Egretta caerulea*)

Similar in size to the **Snowy Egret**, this heron is a dark, blue-gray as an adult and white when immature. During their awkward adolescence, they have a mottled blue and white plumage as seen above.

The little blue heron is relatively uncommon, but probably nests on the island. Juveniles, with their white plumage, may infiltrate groups of snowy egrets. Like most herons, they typically eat aquatic prey, standing motionless or stalking slowly through shallow water. At Étang de la Barrière, I saw one adult catch a shrimp the size of its head.

Apparently these herons were once more numerous on the island. In 1938, Kruythoff notes that they are “Very common; to be found on all swamps and around ponds.”



Green Heron (*Butorides virescens*)

The green heron is a small heron that isn't actually green. It is quite common, and typically seen around water. They are primarily nocturnal but will also hunt during the day. A local name for this bird is **Gaulin**.

This species is typically solitary, and they will exploit a wide variety of foods, including fish, frogs, lizards and insects. They are also thought to eat chicks from the nests of smaller birds. They are also known to drop small objects into the water to attract fish, one of the few known examples of a bird using tools.



Tricolored Heron (*Egretta tricolor*)

This heron is similar in appearance to the **Little Blue Heron**, but has a white belly. It is quite rare on St. Martin and the rest of the Lesser Antilles.

This heron was first seen on St. Martin in 1955, and has always been considered a rare visitor to the island.



Great Blue Heron (*Ardea herodias*)

The great blue heron is our largest heron, and is mostly gray, with a black stripe above the eye. On St. Martin, it is primarily a winter visitor. It is typically seen fishing along the shorelines of our salt ponds.

Although impressive in stature, they are quick to take flight when they see people, even from a distance. Though not rare on the island in the winter, they are less common than the herons that live here year-round.



Cattle Egret (*Bubulcus ibis*)

The cattle egret is a small, predominately white egret with a yellow bill. During the breeding season, the bill turns reddish and it develops orange-tan patches on its head, chest and back. Although it is very common on the island today, it was first seen here in 1962. This species is native to Africa, Asia and Europe, but crossed the Atlantic on its own, becoming established in South America in the 1930s and spreading across the Americas in the following decades. They forage with livestock, catching the insects and other small animals that are disturbed by the grazing. This feeding strategy is several times more effective than foraging alone.

DUCKS

Although a dozen species of duck have been seen on St. Martin, Karel Voous did not include a single species in the list he published in 1955. He was told that ducks were heavily hunted when they were on the island, which probably accounts for the lack of ducks during that era. In 1938, S. J. Kruythoff noted that “the arrival of the motor car seems to have scared many ducks away.”

Species not pictured here include: **Northern Pintail** (*Anas acuta*), **American Wigeon** (*Anas americana*), **Cinnamon Teal** (*Anas cyanoptera*), **Lesser Scaup** (*Aythya affinis*), **Ring-necked Duck** (*Aythya collaris*) and **Bufflehead** (*Bucephala albeola*), most of which are rare visitors to St. Martin. **Domesticated Geese** (*Anser anser domesticus*) and **Muskovy Ducks** (*Cairina moschata*) are also raised on the island.



White-cheeked Pintail (*Anas bahamensis*)

Supposedly rare in most of the Lesser Antilles, this duck is quite common on St. Martin, probably due to the large number of salt ponds.



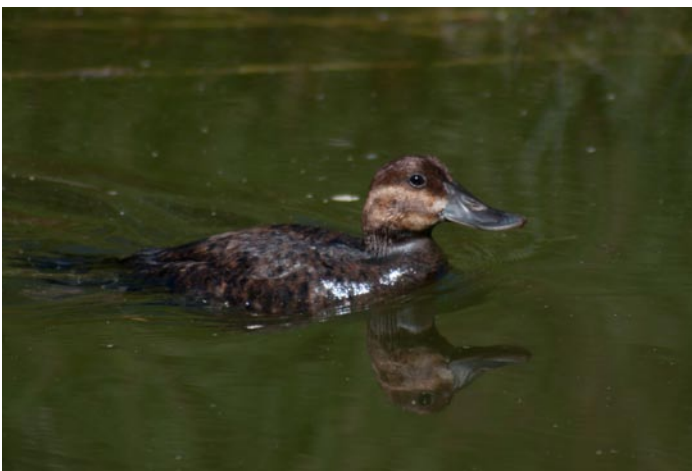
Ruddy Duck (*Oxyura jamaicensis*)

The male ruddy duck has a distinctive blue bill. This species is relatively common on St. Martin, possibly breeding here. It is typically seen in pairs or groups.



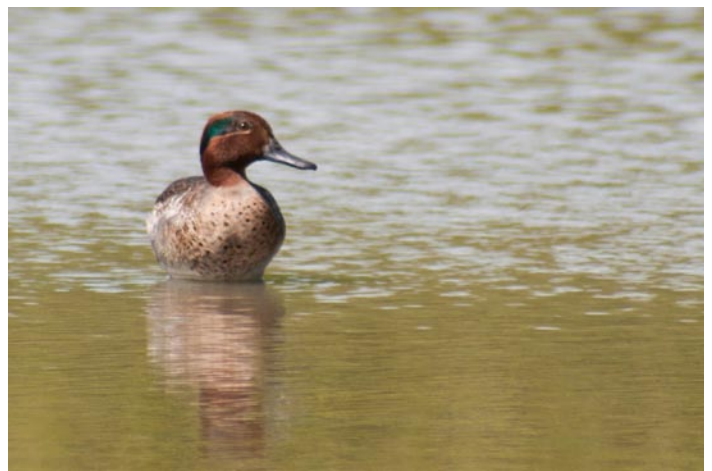
Blue-winged Teal (*Anas discors*)

A common winter resident, males have a distinctive black head with a white band when in breeding plumage. A bright blue band on the wings is visible in flight.



Ruddy Duck (*Oxyura jamaicensis*)

The female ruddy duck shares the wide beak and general shape of the male, but is less distinctive. It is typically seen with a male or a flock, making identification easier.



Green-winged Teal (*Anas carolinensis*)

This small duck was first recorded on St. Martin in late 2012 by the author. The male has a distinctive green band behind the eye.

OTHER WATERFOWL

Several members of the grebe (Podicipedidae) and rail (Rallidae) families live on St. Martin. They inhabit the salt ponds of the island.

Not pictured here are the **Caribbean Coot** (*Fulica caribaea*), which looks almost identical to the **American Coot**, without the red on the forehead and the **Sora Rail** (*Porzana carolina*). The sora is both rare in this area and extremely secretive, staying in dense vegetation in wetland areas. The two species of coot are also known to hybridize, making it more difficult to be absolutely certain of the species.

Kruythoff notes that the coot is “a very shy bird; not easily discovered.” He also remarks that the gallinule is “a winter visitant. Found on very remote ponds and swamps. A shy bird.” Today, the gallinule has largely overcome its shyness.



Common Gallinule (*Gallinula galeata*)

Formerly the **Common Moorhen**, the American and European moorhens were split into two species in 2011. Locally known as the **Water Chicken**, due to its chicken-like feet.



Pied-billed Grebe (*Podilymbus podiceps*)

This small bird looks something like a duck, and typically floats with much of its body underwater. It dives underwater to hunt for fish and invertebrates.



Common Gallinule (*Gallinula galeata*)

A common breeding resident, it builds nests of grass and sometimes trash. Gallinule chicks have similar coloration to their parents, as well as a noticeable bald spot on their head.



American Coot (*Fulica americana*)

This member of the rail family breeds on St. Martin, as does its cousin the **Caribbean Coot**. Their primary food is algae, although they will eat small animals on occasion.



Common Gallinule (*Gallinula galeata*)

Immature gallinules are a mottled brown, and quite similar to similarly-aged coots. However, they are typically seen in the vicinity of their parents, making identification simpler.

DOVES AND PIGEONS

The family Columbidae includes doves and pigeons. The terms dove and pigeon don't mean anything biologically, but often the larger members of this family are called pigeons and the smaller ones doves. Traditionally, these birds have been hunted for food and sport, a practice that continues today.

Many of the doves on the island are commonly seen in urban areas, while a few are quite rare and secretive. Not pictured here are two doves seen only a few times on the island, the **Bridled Quail Dove** (*Geotrygon mystacea*) and the **White-crowned Pigeon** (*Patagioenas leucocephala*). Also not pictured is the **Rock Dove** (*Columba livia*), which is the widespread pigeon that is seen in cities around the world.



Scaly-naped Pigeon (*Patagioenas squamosa*)

Found throughout the Caribbean, it is known locally as the **Blue Pigeon**. Eagerly hunted, it is rare on the island, seen occasionally in the forested hills.



Common Ground Dove (*Columbina passerina nigristrois*)

Our smallest dove, this subspecies is found only in the Lesser Antilles. During flight, their rusty-red wing feathers are visible. Common in scrub and savanna, less so in urban areas.



Eurasian Collared Dove (*Streptopelia decaocto*)

Introduced in the Bahamas in the 1970s, this dove has expanded its range in the Caribbean and is very common on St. Martin today. It is most often seen in urban areas.



Zenaida Dove (*Zenaida aurita aurita*)

Known locally as the **Mountain Dove**, this dove is common in both scrubland and urban areas. The subspecies here is endemic to the Lesser Antilles.



White-winged Dove (*Zenaida asiatica*)

A recent arrival in St. Martin, this dove has been expanding its range in the Caribbean. It is similar to the **Zenaida Dove**, but has blue around the eye and white bars on its wings.

HUMMINGBIRDS

There are two hummingbirds, family Trochilidae, on St. Martin. Both are found only in the Caribbean, and the local name for both is **Doctor Bird**.

Hummingbirds drink nectar and eat some insects and spiders to balance their diet. They are small, and able to beat their wings with incredible speed, allowing them to hover and fly backwards.

The high metabolism of hummingbirds leaves them constantly in search of food, and they will vigorously defend a tree where they are feeding. They are also highly vulnerable to disruptions in the nectar supply, such as a hurricane and its aftermath. After an event like this, the local population may be almost entirely wiped-out, requiring years to build back up to normal levels.



Antillean Crested Hummingbird (*Orthorhyncus cristatus*)
The male crested hummingbird has a prominent crest on the head and a dark underside. This species is particularly small, even for a hummingbird.



Green-throated Carib (*Eulampis holosericeus*)
The larger of our two species, this hummingbird has iridescent green on its throat and back and a long, downcurved bill. Depending on the light it may look mostly black.



Antillean Crested Hummingbird (*Orthorhyncus cristatus*)
Hummingbird nests are small and intricately constructed, usually only a few centimeters in size, and are lined with soft fibers, often wild cotton. A typical clutch is two eggs.



Antillean Crested Hummingbird (*Orthorhyncus cristatus*)
Our subspecies, *exilis*, is found in the Northern Lesser Antilles and Eastern Puerto Rico. The female has a very small crest and a light gray underside.



Antillean Crested Hummingbird (*Orthorhyncus cristatus*)
Chicks are fed and protected by the mother alone, and are able to leave the nest about twenty days after hatching. By this time, they can barely fit into the nest.

BIRDS OF PREY

Only a handful of raptors live on St. Martin today. The **Red-tailed Hawk** (*Buteo jamaicensis*), known locally as the **Chicken Hawk** was a breeding resident, but was wiped out due to its reputation as a chicken killer. Individuals are occasionally seen, but the return of a breeding population has not happened yet. The **Peregrine Falcon** (*Falco peregrinus*), may be seen regularly and the **Merlin** (*Falco columbarius*) occasionally.



Osprey (*Pandion haliaetus*)

Known locally as the **Fish Hawk**, the osprey is a large, fish-hunting raptor. It is the only living member of the family Pandionidae in the world.

The osprey is most commonly seen fishing offshore or in our salt ponds. They swoop down over the water and grab fish in their talons. After a successful catch, they typically fly to their roost somewhere in the forested hills. They are capable of catching large fish, including **Tarpon** (*Megalops atlanticus*). They may have noticeable difficulty flying when carrying a particularly large catch, and usually hold their fish pointing forward for better aerodynamics.

Our ospreys seem to be from the migratory subspecies, *carolinensis*, which has a thick dark bar extending behind the eye. The osprey is uncommon on St. Martin, but generally more common in the winter months.



American Kestrel (*Falco sparverius caribaeorum*)

Locally known as the **Killy-killy** because of its distinctive call, the kestrel is a small falcon that is quite common on St. Martin. Our subspecies is endemic to Puerto Rico and the Lesser Antilles.

The kestrel feeds primarily on lizards, insects and other small animals and is most often seen on a tall branch, rock, cactus or electric line where it can survey the surrounding area for prey. Once prey is spotted, the bird will swoop down to make the catch, then return to a high perch to eat it. In some areas, kestrels may also be seen using air currents to hover over the ground in search of food (top photo).

The male and female kestrel are slightly different in appearance. The upperside of the male's wings are blue-gray, while the female's are brown like her back.

The kestrel is a full-time, breeding resident on the island. They are seen regularly in urban areas, and seem relatively comfortable with the presence of humans, unlike the other birds of prey on the island.

KINGFISHER AND CUCKOO

Kingfishers (family Cerylidae) and cuckoos (family Cuculidae) are quite similar to the passerine birds in the next section, but different enough to be classified into separate orders. Although they are not related to each other, both happen to be quite attractive, relatively shy and a bit larger than most of our passerines.

Not pictured here is a second species of cuckoo, the **Yellow-billed Cuckoo** (*Coccyzus americanus*), which is quite similar to the **Mangrove Cuckoo**, but has a white belly and some yellow near the base of its upper bill.



Belted Kingfisher (*Megaceryle alcyon*)

The kingfisher is typically seen near ponds, the lagoon or protected bays. They fish by diving headfirst into the water. Typically this species fishes in ponds or rivers, but on St. Martin it will also fish in the sea. Our kingfishers are non-breeding visitors who spend the winter here.

In his 1955 article, Karel Voous gives the following description of the kingfisher on St. Martin:

Regularly seen on St. Martin, flying low at full speed over Great Bay and Simpson Bay. We observed it occasionally perching on the telephone wires along the road bordering the salt ponds behind Philipsburg. On such occasions it was extremely tame and we could approach it to within a few meters. All specimens were males; it is possible, of course, that all these observations refer to one single individual, which was finally short.

Although not common on the island, our kingfishers seem to have preferred roosting and feeding areas. Once located, it is relatively easy to see the same bird frequently. Both males and females have a broad, blue band across their chest. Females have a second, rust-colored band across their belly.



Mangrove Cuckoo (*Coccyzus minor*)

The mangrove cuckoo is more often heard than seen. It's all is a bizarre, repeated croaking sound that is quite unmistakable. As one might imagine, they may be found in mangroves, but also in scrub and forest areas. S. J. Kruythoff referred to this species as **Cat Bird**, "found among mangroves, on swamps and sage thickets."

The mangrove cuckoo is a breeding resident of the island, and primarily eats insects and other small animals. I typically find them hidden within the crown of a tree. When approached, they usually hop to another branch rather than fly away entirely.



PASSERINES

Passerines are birds from the order Passeriformes, which includes more than half of all birds. They may also be called perching birds or songbirds, although perching birds may include non-passerines who perch and songbirds typically refers to a subset of passerines. The main distinguishing characteristic of these birds is that they have three toes pointing forward and one pointing backward.

Passerines on St. Martin include both resident and overwintering species. Although a handful are commonly seen in urban areas, many are rarely seen at all. While all of the commonly-seen and locally-endemic species are featured here, a number of species, including some rare visitors, are not pictured. These are listed below.

The **Cliff Swallow** (*Petrochelidon pyrrhonota*) and **Caribbean Martin** (*Progne dominicensis*) are members of the swallow family (Hirundinidae). The Caribbean martin is the only swallow known to nest on St. Martin. The **Black Swift** (*Cypseloides niger*) is also seen rarely, typically before big storms. The **Scaly-breasted Thrasher** (*Alenia fusca*) is the cousin of the **Pearly-eyed Thrasher**, from the family Mimidae. The **House Sparrow** (*Passer domesticus*) is from the family Passeridae and should be recognizable to most. The

Fork-tailed Flycatcher (*Tyrannus savana*) is a close relative of the **Gray Kingbird** in the flycatcher family (Tyrannidae). There are three vireos (Vireonidae) documented on St. Martin, the **Black-whiskered Vireo** (*Vireo altiloquus*), **White-eyed Vireo** (*Vireo griseus*) and **Red-eyed Vireo** (*Vireo olivaceus*).

There are also many members of the warbler family (Parulidae), that are primarily overwintering visitors. These include the **Black-throated Blue Warbler** (*Dendroica caerulescens*), **Prairie Warbler** (*Dendroica discolor*), **Magnolia Warbler** (*Dendroica magnolia*), **Blackpoll Warbler** (*Dendroica striata*), **Worm-eating Warbler** (*Helminthos vermivorum*), **Connecticut Warbler** (*Oporornis agilis*), **Louisiana Waterthrush** (*Parkesia motacilla*), **Northern Waterthrush** (*Parkesia noveboracensis*), **Northern Parula** (*Parula americana*), **Prothonotary Warbler** (*Protonotaria citrea*), **Ovenbird** (*Seiurus aurocapilla*), **Blue-winged Warbler** (*Vermivora cyanoptera*), **Tennessee Warbler** (*Oreothlypis peregrina*) and **Hooded Warbler** (*Wilsonia citrina*).

Although this seems like a lengthy list of omissions, anyone making the effort to find most of these birds will probably already have a more extensive guide to the birds of the Caribbean.



Lesser Antillean Bullfinch (*Loxigilla noctis ridgwayi*)

This bullfinch is endemic to the Lesser Antilles and Virgin Islands. Locally, it may be called a **Robin** or **Redbreast**. It is a breeding resident of the island.

Males are predominantly black, with orange-brown patches on the throat, near the eyes and sometimes under the tail. Females are primarily brown. The bullfinch has a thick, seed-crushing bill. Females are similar in appearance to female **Black-faced Grassquit**, but are significantly larger.

The bullfinch may be found in a variety of habitats, from sea grape stands near the beach to dry scrub and hillside forest. In 1938, S. J. Kruthoff explained it was “found all over the islands, in mountain, on lowlands, and in pasture. A very cheerful bird. Often nests around dwellings.”

Carib Grackle (*Quiscalus lugubris guadeloupensis*)

Also known as the **Lesser Antillean Grackle**, or locally as the **Blackbird**, this bird is found in the Lesser Antilles and northern South America, although our subspecies is endemic to the northern and central Lesser Antilles.

Adult male grackles are all black, while females are brown with a gray underside. Juveniles are similar in appearance to females, but their eyes are dark rather than yellow-white.

This species was first recorded on St. Martin in 1973. Today it is quite common in some areas of the island, but absent in others. Even during the past few years, it seems to have become more widespread on St. Martin.

The grackle is primarily an insectivore, but it will also scavenge food from human leftovers, and may be relatively bold in doing so.

The male grackle performs a song and dance routine to attract a mate that involves a somewhat melodic song and much ruffling of feathers.



Bananaquit (*Coereba flaveola bartholemica*)

One of the most frequently seen birds on the island, the bananaquit has a host of local names, including **Yellowbreast**, **Sugar Bird** and **Sucrier**. Its classification is somewhat uncertain, and it is sometimes placed in a family by itself, Coerebidae and sometimes in the family Thraupidae.

The bananaquit has a well-known love of sugar, but will also eat insects. It is quite comfortable around humans and will sip from sweet drinks or feed at sugar feeders. It builds a spherical nest from grasses that typically has its opening on the side.



Gray Kingbird (*Tyrannus dominicensis*)

The gray kingbird is also known as the **Pitirre**, and locally as the **Chincherry**. It is common in scrub, savanna and urban areas, usually perching on an exposed branch or electric line. It is a member of the tyrant flycatchers, family Tyrannidae, and typically catches insects on the wing.

The kingbird is often quite noisy, particularly during the morning and evening. It is a graceful flyer, often making short trips to catch insects before returning to its perch. When it catches a large insect, like the katydid above, or a dangerous one, like the **Jack Spaniard** wasp, it will repeatedly beat the insect against its perch until it is dead and tender.

Kingbirds often nest high in trees or on telephone poles. On occasion, I have seen them chasing much larger egrets or herons, perhaps defending their nest against predation.

Upon close inspection, the kingbird has noticeable whiskers near the base of its bill. It also has an orange stripe down the top of its head that is almost never visible unless its feathers are ruffled by the wind.



Black-faced Grassquit (*Tiaris bicolor*)

The grassquit is a small tanager, closely related to the famous finches of the Galapagos. Locally it has been known as the **Tobacco Seed**, **Chee-chee Bird**, or **Sparrow**. The male is brown with a black face and belly. Females and juveniles are a drab olive-brown, similar to the female **Lesser Antillean Bullfinch**, but much smaller.

The grassquit is most common in scrub and savanna, and is light enough to perch on a thick stalk of grass. They may also be seen foraging for seeds on the ground. S.J. Kruythoff found it the “commonest of all birds on the islands.”



Caribbean Elaenia (*Elaenia martinica*)

This small flycatcher has a lovely, whistling call and may be found in scrub, wetlands and forest. Local names include the **Cheery-cheer** and **Whistler**.



Yellow Warbler (*Setophaga petechia bartholemica*)

Also known as the **Mangrove Warbler**, and locally as the **Canary**, **Goldfinch** or **Banana Bird**, it may be found in wetlands and scrub and is a breeding resident of the island.



Barn Swallow (*Hirundo rustica*)

A migrant passing through the island in the spring and fall, it may appear in great numbers, acrobatically hunting flying insects along the shoreline or in the sky.



American Redstart (*Setophaga ruticilla*)

One of our most common overwintering residents, the redstart flies down from North America to winter in our forests. Male pictured above, the female is gray with yellow patches.



Pearly-eyed Thrasher (*Margarops fuscatus*)

Known as the **Thrush**, Kruythoff calls it “a jolly bird, and fairly good singer.” It primarily eats insects and lizards, but will also feed on fruit and even human food scraps.



Black and White Warbler (*Mniotilta varia*)

A common overwintering warbler in St. Martin, it is often found in the hillside forests of the island. This bird was photographed while being banded for research purposes.



REPTILES

Reptiles are vertebrates from the class Reptilia. This class is a bit unusual, as it includes all the vertebrates that have an amnios (a membrane surrounding their embryo), except birds and mammals. Typically taxonomists prefer classifications that are monophyletic, which means they contain all the species that are descended from a particular common ancestor. Reptilia is paraphyletic, meaning it includes all the descendents of a common ancestor except certain groups.

Physically, reptiles are exothermic (cold-blooded) and are usually covered in scales or scutes (bony plates). They have been around for over 300 million years.

More than any other group of animals, our reptile fauna is unique to St. Martin. Including species that are probably gone from the island, there are three species and one subspecies unique to St. Martin, four species found only on the islands of the Anguilla Bank, and two that are limited to the Lesser Antilles.

Reptiles typically have a low metabolism because they obtain heat from their environment rather than generating it themselves. This may help them survive sea crossings from island to island on rafts of vegetation without food. However, colo-

nization events like this are still rare. Because of this, reptiles are able to colonize islands, but island populations are largely isolated and evolve into unique species over time. By comparison, most mammals have difficulty colonizing oceanic islands because they are more likely to starve before they reach land, and birds are less likely to form isolated populations because they are able to travel to and from islands regularly.

Throughout the Lesser Antilles, there are many locally endemic species found only on a single island or a handful of islands. Some, particularly anole lizards, have been the subject of much study. They are a keen example of adaptive radiation, a process by which a single ancestor evolves into a number of different species adapted to different environments.

St. Martin also has a particularly high number of introduced reptile species considering the size of the island. This is probably linked to the large amount of trade, as many reptiles are introduced via the import of ornamental plants and trees for landscaping and building materials. Studying patterns of reptile introduction in St. Martin, and the interactions between native and introduced species may be useful in predicting the future of less-developed islands in the Lesser Antilles as they follow a similar path towards increasing development and tourism.

Bearded Anole (*Anolis pogus*)

Also known as the **Anguilla Bank Bush Anole**, this species is found only on St. Martin. The species is currently considered vulnerable because it only lives on one island and its range is somewhat restricted even on St. Martin. It was named *pogus* after the cartoon character Pogo the Possum by herpetologist James “Skip” Lazell, to illustrate the point that scientific names don’t necessarily need to have any meaning.

This anole was last collected on Anguilla in 1922 and presumably died out there shortly thereafter. It is likely that it also lived on St. Barths at some time, as both islands were connected to St. Martin during the last ice age approximately 12,000 years ago.

Typically described as tan with blue around the eyes, these lizards may change color dramatically based on their mood and surroundings. They are slightly smaller than their cousin the **Anguilla Bank Anole**.

This species is typically found in shady areas, probably because they have difficulty withstanding the heat of direct sunlight. During the 1960s it was thought that they were largely restricted to forested ravines, and during the 1970s their known range was expanded to include the hillsides. Today, they may be found anywhere with sufficient cover, including urban areas and landscaped resorts, although they remain most common in the forest.

The ratio in size between the **Anguilla Bank Anole** and this lizard is approximately 1.2, which is much closer than the average on nearby islands with two native species. For this reason, the relationship between the two species has been the subject of studies about how different species of *Anolis* compete for food and resources.



The dewlap of this species is a light, lemon yellow. Male anoles will use their dewlaps to attract a mate and to warn other males that are entering their territory.



In the forest, this species is often dark with a brick-red face and irregular bands on its back. They are most common on the forest floor and rocks, stumps and vegetation within a few feet of the ground.



Two males are fighting over a desirable perch. Threatening coloration includes black bars behind the eyes and black on the tip of the tail. Males will also arch their back to appear larger when engaged in a territorial dispute.



Juveniles typically have more distinct markings, with a light line running down the back interrupted by irregular bands. They may also have a rainbow of blue, green, yellow and red, particularly around the head and neck.

Anguilla Bank Anole (*Anolis gingivinus*)

This anole is undoubtedly the most commonly-seen lizard on the island. It is found throughout the Anguilla Bank, including Anguilla, St. Barths and most of the smaller islets. Its distribution on St. Martin is island-wide, from the forests and scrub to urban areas and even the sea shore. It is known locally as the **Tree Lizard**, a name which may be used for any anole.

Anoles are sit-and-wait predators. They will remain on a perch and then run or jump to catch insects. This species typically perches on the lower regions of tree trunks or shrubs. Anoles make the decision to pursue prey based on the size and distance of the prey in order to hunt as efficiently as possible.

Both native anoles on St. Martin are typically placed in what is known as the Bimaculatus Group. This group includes species found in the northern Lesser Antilles and it is hypothesized that they originated in the Greater Antilles. In the southern Lesser Antilles, the anoles are typically placed in the Roquet Group, and are thought to have come from South America.

While this species varies somewhat in color and patterning, one consistent characteristic is a light stripe running down each side between the front and back legs. Otherwise, the color may vary from tan to dark brown, sometimes with a green cast, particularly on the tail. There is typically a band down the back with light or dark markings.



The dewlap of this species is bright orange. Because the color and pattern varies from species to species, dewlaps are often used to identify anoles in the field. This individual also has visible scars, probably from a recent fight over territory.



The female of this species is similar in color and pattern to the male, but somewhat smaller. At night these lizards sleep on leaves and branches to avoid predation.



This male has raised his dorsal crest and adopted aggressive coloration in anticipation of a territorial dispute with another male.



Juveniles of this species typically have a more pronounced light band down their back. They grow to full-size in approximately five to nine months, but may be sexually active before reaching full size.

Puerto Rican Crested Anole (*Anolis cristatellus*)

As its name implies, this anole is native to the islands of the Puerto Rico Bank, including Puerto Rico and the Virgin Islands. It was first seen here by Karl Questel in 2008 on a small islet in the Simpson Bay Lagoon that is part of a resort and casino complex. Since then, its range has expanded to mainland St. Martin, but not beyond the resort complex.

The provenance of this species is unknown. In many cases, reptiles are introduced to the Lesser Antilles via Florida, which is the primary source of decorative plants and building materials. This species is established in Florida, making this route a distinct possibility. There is also a large amount of yacht traffic between St. Martin and the Virgin Islands, which is a second possible route of introduction for this species.

In the Greater Antilles, where anoles are much more diverse, biologists often classify species into ecomorphs. These are different species that occupy the same ecological niche on different islands and have corresponding physical (morphological) characteristics. This species is what is known as a trunk-ground ecomorph, typically perching on the lower trunk area of a tree. Although the anoles of the Lesser Antilles are not grouped into ecomorphs, the **Anguilla Bank Anole** is closest in habit and structure to this group.

This species will be watched closely. Some anole populations introduced by humans die out over time, something that has happened on St. Martin before. On the other hand, this species has been very successful in other locations where it has been introduced. Due to its similarities to our native species, it may pose a competitive threat if it is able to survive and expand its range.



A male crested anole with its crest raised. The yellow skin between the white scales on the throat of this lizard show the color of the dewlap when extended, which can range from yellow to red.



A male (top) and female (bottom) demonstrate that the crested anole is breeding on St. Martin. While breeding may happen year-round, more eggs are typically laid in the rainy season when more prey is available.



The male crested anole has a prominent, jagged crest along the top of its tail. It may also raise a crest along its back to the base of the head, to intimidate rivals or appear larger to predators.



An immature crested anole occupies its preferred perch, the lower area of a tree trunk. All the anoles of St. Martin have similar preferences when choosing a perch, potentially putting them into competition with each other.

Cuban Brown Anole (*Anolis sagrei*)

This anole is another very successful invader, native to Cuba and the Bahamas. Our population was first noticed in 2010 by Axel Fläschendräger near the harbor in Philipsburg. Today its range seems to be restricted to the cruise ship terminal and immediate vicinity. It is well-established in Florida, which is the likely source of our population.

Like the **Puerto Rican Crested Anole**, this species is considered a trunk-ground ecomorph. Compared to other trunk-ground species, it is relatively small and has some physical similarities with the anoles from the grass-bush ecomorph. This is significant because our native **Bearded Anole** is similar to this ecomorph, indicating these two species may put competitive pressure on each other. In the southern US, the Cuban brown anole has had a significant impact on the native **Carolina Anole** (*Anolis carolinensis*). A similar confrontation on St. Martin could pose a risk to a native species that lives nowhere else in the world.

The brown anole is often found in open areas, including urban environments, and it may find these areas easier to colonize compared to natural environments where other species are well-established. The large amount of urban and disturbed habitat on St. Martin may help this lizard expand its range on the island.



The female brown anole may be tan to dark brown, and their markings may be varied, but are often indistinct.



This juvenile brown anole has a brick-red head and prominent markings on its back. These markings will fade or disappear entirely as it matures.



This male brown anole has adopted very light coloration in order to blend into the rocks and dry grass where it is foraging.



A hatchling brown anole provides evidence that the species is successfully breeding on St. Martin, although it remains restricted to a small area.

Green Iguana (*Iguana iguana*)

The green, or common iguana is an introduced species that has experienced a population boom on St. Martin during the last decade. The species has a wide distribution and has been introduced to many islands in the Lesser Antilles.

For some portion of the 20th century, after the extirpation of the **Lesser Antillean Iguana** and before the introduction of the green iguana, there were no iguanas on St. Martin. S. J. Kruythoff does not record iguanas on St. Martin in his 1938 book, indicating that native iguanas may have been extirpated by then. The memory of the native population lived on in place names, like Guana Bay and Guana Key, but the iguana itself was gone from the island.

The story of the introduction of green iguanas is apocryphal, and typically involves two crates of iguanas flown to the island, presumably for food or the pet trade, but left uncollected. A sympathetic worker released them into the wild so they would not die in the crates. In some versions, these events coincided with Hurricane Luis, which devastated the island in 1995.

For some time, the green iguana was primarily found in Flamingo Pond, near the airport. In 1998, during an expansion of the airport, this pond was destroyed and iguanas were moved to other parts of the island, and their range and population increased dramatically from that point on.

Today, the green iguana is found all over the island and often in great numbers. It is also present on most of the nearby islets, including Tintamarre, Pinel and Petite Clef. Although primarily vegetarian, they may pose a threat to nesting birds and native reptiles.



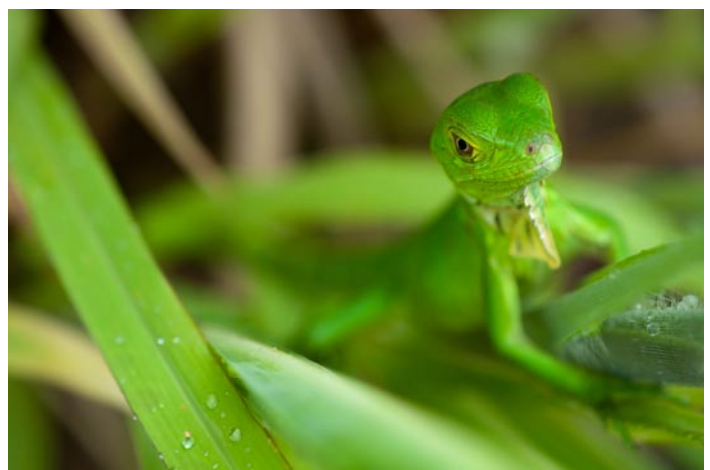
Adult green iguanas are not necessarily green. Many adults are a mottled gray, some almost black, probably to absorb as much heat from the sun as possible.



Male iguanas often develop orange coloration during the breeding season. Green iguanas are easily identified by the large, round scale below the ear, known as a subtympnic scale. It is not present on the **Lesser Antillean Iguana**.



Iguanas are excellent swimmers and will readily leap into the water to avoid predators. They are more graceful when swimming than on the land, and can travel long distances underwater before checking to see if the coast is clear.



Young green iguanas are very bright green in color, and the intensity typically fades as they grow. This individual was licking water droplets from grass after a rain shower.

Saint Martin Skink (*Spondylurus martinae*) and
Anguilla Bank Skink (*Spondylurus powelli*)

These two species were first described in 2012, when researchers undertook a detailed examination of both the physical characteristics and genetics of skinks from around the Caribbean. Prior to the 2012 study, which named 24 new species of skink in the Caribbean, the skinks of St. Martin and many other islands were assumed to be from a handful of species in the *Mabuya* genus rather than a diverse group of island and island bank endemics. The analysis primarily used museum specimens, because on many islands skinks are rare, or possibly extinct, due to introduced predators like the mongoose.

Skinks form the family Scincidae, and are one of the most diverse groups of lizards in the world. They may be called **Slipperybacks** due to their shiny scales. They often have short limbs and no identifiable neck, giving them a snake-like appearance. On St. Barts, they are known as **Couleuvre Bâtarde**, French for “bastard racer snake.” This comes from the belief that these lizards are the hybrid offspring of the **Anguilla Bank Ameiva** and the **Leeward Island Racer**.

The description of the Saint Martin skink was based on museum specimens collected in the late 1800s by Hendrik van Rijgersma and a specimen collected by G. A. Scamon at an unknown date prior to 1965. When it was described, it was thought that this species may have been extinct, perhaps for decades or even a century.

In March 2013, a group of researchers working on a project to understand and control rat populations on Tintamarre discovered skinks on that island. Due to Tintamarre’s position relative to St. Martin and St. Barts, it was unclear which species of skink was found. It could either be the Saint Martin skink, or the Anguilla Bank skink, which is found on Anguilla and St. Barts.

Until they are studied further, we won’t know if the skinks of Tintamarre are from a species living on other islands today, or one that may not have been seen in over 100 years. If they are the Anguilla Bank skink, then perhaps the Saint Martin skink is extinct, or perhaps a small population has survived somewhere on St. Martin waiting to be discovered again.



The holotype of the Saint Martin skink. A holotype is the specimen from which a species is first described. (Photo by S. Blair Hedges, specimen courtesy of the Museum of Comparative Zoology)



The Anguilla Bank skink typically lives in areas that offer protection from predators, like the old stone walls that crisscross our islands. This makes them challenging to study. (Photo taken on St. Barts by Karl Questel)



The young Anguilla Bank skink has a bright blue tail to divert the attention of predators away from the rest of the body. The tail can break off, leaving the rest of the skink to go free. (Photo taken on St. Barts by Karl Questel)

Anguilla Bank Ameiva (*Ameiva plei analifera*)

Also known as the **Ground Lizard** or the **Gray Sand Lizard**, this species is found only on the islands of the Anguilla Bank. The subspecies *analifera* is found only on St. Martin. Similar species from the same genus are found on most of the Lesser Antilles as well as Central and South America.

The ameiva on St. Martin is much less common than on neighboring islands due to predation by the mongoose. It is most commonly found in urban areas that the mongoose avoids. It may be rare or absent in much of its preferred habitat due to the presence of the mongoose.

Like most lizards, it is primarily an insectivore, but it will also scavenge a variety of human food refuse. These lizards are active during the day and prefer sunny areas. In order to maximize the amount of heat they absorb from their surroundings, they typically rest their underside directly on the ground, even when walking, which gives them an awkward, zig-zag gait.

The primary distinguishing features of the *analifera* subspecies are light or irregular dorsal stripes in juveniles, and the presence of a series of dark bars on the shoulders of adult males. On Tintamarre, the subspecies is *plei*, the same found on Anguilla and St. Barths. Although Tintamarre is quite close to St. Martin, it is thought that the prevailing easterly currents may make it as easy or easier for reptiles to arrive there from St. Barths when drifting on rafts of vegetation.



Adult male ground lizards on St. Martin have distinctive black bars on their shoulders that are not present in populations from the other islands in the Anguilla Bank.



Ground lizards spend their nights in burrows, often under rocks, logs or man-made objects. This offers some protection from nocturnal predators when these lizards are cold and sluggish.



True to its name, the ground lizard is typically found on the ground, where they roam around in search of insects and other prey.



Immature ground lizards on Tintamarre are noticeably different than those on St. Martin. The stripes down their back are clear and distinct. Newborns on St. Martin often have the same stripes, but they usually begin to fade at a young age.

Turnip-tailed Gecko (*Thecadactylus rapicauda*) and **Spotted Woodslave** (*T. oskrobapreinorum*)

These two closely-related geckos are known locally as the **Woodslave**. The turnip-tailed gecko is found in much of the Lesser Antilles, as well as Central and South America. The spotted woodslave lives only on St. Martin, and was first determined to be a new species in 2011. The spotted woodslave may be identified by its patterning, distinct dark spots on a light background. It also differs from the turnip-tailed gecko in the number of scales around the mouth and the number of lamellae (scale-like structures) on the feet. The distinct patterning of St. Martin's turnip-tailed geckos is quite obvious, so in that sense this "new" species has been known for a long time. In the paper describing *T. oskrobapreinorum*, the authors were unaware that *T. rapicauda* is also present on St. Martin, so much work remains to understand the relationship between these two species.

Both species are larger than the other geckos found on the island and have a thick, bulbous tail. The toe pads of these geckos are particularly wide, with a furrow running down the middle. They are able to shed their tails to distract predators. Their delicate skin comes off easily as well, to help them escape the grasp of predators.

Like most geckos, the lamellae on their feet have bristle-like setae that act like microscopic velcro and help them walk on vertical surfaces. This ability gave rise to the legend that if a gecko was on your skin it could only be removed by burning it with a hot iron. This, of course, is not actually true.

These geckos are primarily nocturnal, and may be found during the day hiding under stones, in the hollows of trees or beneath loose bark, particularly that of large **Tamarind** (*Tamarindus indica*) trees. At night, they forage for insects, primarily on the trunks of large trees.



The **Turnip-tailed Gecko** is typically brown with irregular mottling. Individuals may change their color to be darker or lighter depending on their surroundings and mood.



Both of these geckos have a thick tail that is typically enlarged at the base. The tail is used to store fat, but may also be shed to distract predators.



The **Spotted Woodslave** has a thick, stocky build and relatively loose, baggy skin. It can be distinguished by its irregular, but distinct, black markings on an otherwise plain tan skin. The small red spots on this specimen are parasitic mites.



The distinctive, wide toes of these geckos are seen here from below. Also visible are a large number of parasitic mites and several patches where skin has come off and is in various stages of healing.

Tropical House Gecko (*Hemidactylus mabouia*)

This species is also known as the **Cosmopolitan House Gecko**, because it successfully colonized much of the Americas from its native Africa. In the Caribbean it is often called the **Mabouia**. On St. Martin, the term **Woodslave** is also used for this gecko.

Most scientists believe this gecko was introduced to the Americas inadvertently by humans, although it is also possible that it crossed the Atlantic on its own. Either way, it is a relatively recent arrival that has not significantly diverged from native populations in Africa.

This gecko is often seen in urban areas, particularly where lights attract nocturnal insects. In the wild, its habits are similar to our **Turnip-tailed Gecko** and **Spotted Woodslave**. These geckos produce a clutch of two eggs, which are typically deposited beneath stones or in rotting wood.

In urban areas, this gecko may be extremely light in color, with few visible markings. In the wild, it is typically gray with irregular bands across the back. In both cases, a series of rings are usually visible on the tail.



In urban areas, the house gecko is typically pale in color. It may also be distinguished from the **Turnip-tailed Geckos** by its thinner tail and toe pads.



In the wild, this gecko often spends its days under stones, or beneath loose tree bark.



House geckos have vertical pupils. This individual has two clearly-visible orange mites, probably *Geckobia hemidactyli*. This species of mite probably arrived in the Caribbean with the geckos themselves.



This newly-hatched house gecko has more distinct markings than most adults. The remainder of its yolk-sac is visible beneath its hind legs.

Little Woodslave (*Sphaerodactylus parvus*)

This small gecko is found on the islands of the Anguilla Bank, including Anguilla, St. Martin, St. Barths and most of the smaller surrounding islets. It was formerly considered a subspecies of *S. macrolepis*, which is native to Puerto Rico and the Virgin Islands. It was first recognized as a distinct species in 2001. This species is also called the **Anguilla Bank Dwarf Gecko**. The terms **Dwarf Gecko** or **Sphaero** may be applied to any member of the genus *Sphaerodactylus*.

This gecko is primarily found in leaf litter in forested areas, although in a pinch any leaf litter will do. Populations of dwarf geckos may be incredibly dense. Estimates in ideal habitat are as high as six or seven per square meter. Because of their small size, however, they are rarely noticed.

The diet of this lizard is primarily small insects such as ants. It is typically dark brown with salt and pepper speckling. The head and tail may be lighter brown or orangish. On the back of the neck there is a dark oval with two white eye spots, perhaps to confuse predators. The markings may be more or less distinct from lizard to lizard.

There are over 100 species in the genus *Sphaerodactylus*, many of which are found only in the Caribbean. Two species from this genus are tied as the world's smallest reptile species.



Dwarf geckos are primarily found in leaf litter, where they hunt small insects. They prefer shady areas, perhaps to prevent overheating and to reduce water loss.



In any forested area, a patient observer is likely to see these tiny geckos crawling amongst the leaf litter. They are often very dark in color, appearing like tiny black shadows in the leaves.



A young dwarf gecko seen from below. Its skin is thin enough to make some of the internal organs visible on its underside.



Adult dwarf geckos are small, no more than a few centimeters in length. Newborns are much smaller, as seen here.

Least Island Gecko (*Sphaerodactylus sputator*)

Also known as the **Leeward Banded Dwarf Gecko**, this gecko is found only on the islands of the Anguilla Bank and the St. Kitts Bank (St. Kitts, Nevis and St. Eustatius). It is slightly larger than *S. parvus*, but shares many similarities with its cousin.

This lizard is gray-brown, with irregular light and dark bands and spots. The tail, particularly in juveniles, may be bright orange.

While this gecko is typically found in leaf litter and beneath rocks and logs, on occasion it may be found beneath tree bark. I have even seen it sharing a retreat with a much larger **Turnip-tailed Gecko**.

This gecko was first described in 1784 by Anders Sparrman from specimens from St. Eustatius. Because no additional specimens were collected there for the next 138 years, the name *sputator* was incorrectly applied to similar species until L.G. Andersson reviewed the specimens in 1900. No subspecies are currently recognized, although it would not be surprising if there are some differences between the populations in the Anguilla Bank and those of the St. Kitts Bank.

In 2004, a behavioral study found that interactions between females of this species were “very aggressive.” By comparison, male-male, female-male and interactions with members of a related species were found to be largely passive.



In addition to the major islands of its range, this gecko is also found on many smaller islets, including Tintamarre, Pinel and even Caye Chateau, which offers only a tiny amount of suitable habitat.



This juvenile gecko has a brilliant orange tail. In adults, the orange cast of the tail may be faint or absent entirely.



The **Least Island Gecko** may occasionally be found beneath tree bark, a habit that is perhaps unusual for a species that primarily lives on the forest floor.



This newborn gecko is very small. For scale, it has just crawled through one of the holes in the lid of this spice bottle.



Underwood's Spectacled Tegu

(*Gymnophthalmus underwoodi*)

This small lizard is a type of microteiid, from the family Gymnophthalmidae. Although some species are native to the Caribbean, this one was introduced by humans, and is native to South America. This lizard is named after Garth Leon Underwood, a herpetologist who did quite a bit of work in the region, including a reorganization of *Anolis* classification in the Lesser Antilles. It is called spectacled because it has a transparent lower eyelid, allowing it to see with that eyelid closed.

This lizard is typically found in sunlit savanna, scrub and even rocky beaches. It has a shiny golden back, and only four toes on each front foot. Its diet consists of insects and other small invertebrates.

This species is parthenogenetic, meaning that all of the lizards are female and genetically identical, aside from rare random mutations. This quality enables them to colonize islands easily, as it takes only one individual to start a new population. On St. Martin, this species was first seen in Pointe Blanche in 2003. Today it can be found island-wide.

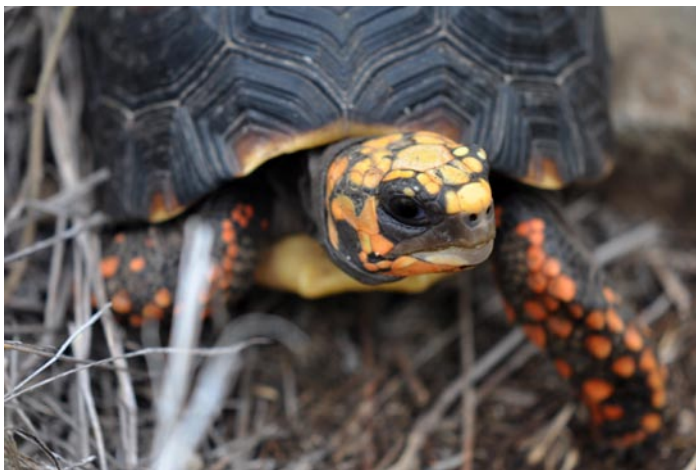
Brahminy Blind Snake (*Ramphotyphlops braminus*)

This small snake is native to Africa and parts of Asia, but has been introduced to many other parts of the world by humans. It is also known as the **Flowerpot Blind Snake**, because it hides in the soil surrounding plant roots. It is spread primarily through the shipping of ornamental plants. It was first reported on St. Martin during the 1990s.

Like **Underwood's Spectacled Tegu**, it is parthenogenetic, with all specimens being female and essentially identical.

This snake is small, less than 20cm long as an adult, and worm-like in appearance. The eyes of this snake are covered in scales and cannot see more than the difference between light and dark. The tail is blunt, to confuse predators about which end is the head. Although it looks like a worm, it has scales and moves very quickly when threatened.

A nocturnal predator of small insects, this species may be found beneath rocks and other debris during the day. At night, they may occasionally be seen hunting in the open.



Red-footed Tortoise (*Chelonoidis carbonaria*)

The red-footed tortoise is rarely seen in the wild today, but many reside in the gardens of local residents. This species ranges from northern South America to Central America and the Caribbean.

The origin of this species on St. Martin and in the rest of the Caribbean is unknown. They may have been introduced by Amerindians, who ate them, and also came to the Caribbean from the Orinoco region where this tortoise is native. Early settlers may have also brought these tortoises with them. In an account published in 1658, Charles de Rochefort mentioned tortoises in the forest on St. Martin, indicating they were well-established at the beginning of the colonial period.

It is also possible that these tortoises arrived by natural means, but unlike most reptiles in the area, they are essentially the same throughout the region, implying they arrived recently, spread quickly and did not have time to evolve into different species on each island. Archaeological remains of giant tortoises related to this species have been found in the Caribbean, indicating that natural dispersal has happened in the past. These giant tortoises may have been hunted to extinction by Amerindians.

Red-eared Slider (*Trachemys scripta elegans*)

Although there are some related species native to the Greater Antilles, this pond turtle was introduced to St. Martin by humans. It is commonly kept as a pet, and our population is almost surely descended from former pets.

On St. Martin, this turtle is primarily found in Fresh Pond, and is sometimes seen in the Great Salt Pond. I have not seen it anywhere else in the wild. It may be difficult for this species to expand its range because sixteen of the twenty ponds that once existed on the Dutch side have been destroyed.

This turtle is typically seen floating on the surface of a pond or sunning itself on a branch or the pond shore. Typically, the distinctive red stripe on its head is visible, but in some older individuals it may be faded or absent. The name slider comes from their propensity to slide into the water when approached.

Although they spend most of their time in the water, they do lay their eggs on land. Similar to sea turtles, the female digs a nest on shore where she lays her eggs. A female may lay eggs multiple times per season, and they typically hatch two to three months after they are laid.

SEA TURTLES

Also known as marine turtles, these members of the superfamily Chelonioidae spend most of their lives at sea, but females return to land to lay their eggs. Of the seven living species of sea turtle in the world, three species are known to nest on St. Martin.

Sea turtles nest on sandy beaches, typically during the night. The nesting season on St. Martin is from April to November. The female turtle will climb onto the beach and find a suitable nesting spot between the middle of the beach and the vegetation line, depending on the species. Using her hind legs, she digs a hole and deposits between 50 and 200 eggs. She then refills the nest with sand and returns to sea. The eggs typically hatch about two months later.

A number of factors may decrease successful nesting on St. Martin, including artificial light on or near the beach that may confuse turtles. Dogs or other animals may disturb turtles, causing them to abandon nests before laying eggs. Man-made obstacles on beaches may also trap turtles or prevent them from reaching a desired nesting spot. Sea turtle hunting, although less common today than in the past, is still a problem, and both nesting mothers and turtle eggs may be taken for consumption.



Green Sea Turtle (*Chelonia mydas*)

The green turtle is actually brown on the outside, but it was named after the color of its calipee, the fat and cartilage on the inside of its shell, which is a key ingredient in turtle soup. Adults may reach 1.5 meters in length and almost 200 kg. Young hatchlings live in the open ocean, but older juveniles and adults typically live around near-shore seagrass beds, where they feed on the seagrass. Many green turtles around St. Martin have tumors known as fibropapillomas. In the photo above, there is a small one in the corner of the eye. These tumors may be linked to pollution, and are an additional danger to a species already considered threatened.



Hawksbill Sea Turtle (*Eretmochelys imbricata*)

The hawksbill is our smallest sea turtle, typically no more than one meter in length and approximately 80 kg. This species is critically endangered, which means it has a high risk of extinction in the wild. Hawksbills primarily feed on sponges, so they are often in the same reef areas where people dive and snorkel. The hawksbill's mouth protrudes in a pointed "beak" and it has overlapping scutes (shell plates) near the tail, giving the back of its shell a serrated look. The tracks of a hawksbill on the beach are asymmetrical, making them easy to distinguish from those of the other species who nest here.



Leatherback Sea Turtle (*Dermochelys coriacea*)

The leatherback is the largest turtle, and the only member of the family Dermochelyidae. They may grow to be over two meters long and 700 kg. Instead of a bony shell, their backs are covered with a leathery skin which has seven ridges running down it. These turtles spend their lives in the open ocean and are rarely seen, aside from when they are nesting or hatching. Jellyfish make up almost their entire diet. This species is critically endangered. (Photo was taken at the Sandy Point National Wildlife Refuge in St. Croix by Claudia Lombard of the US Fish and Wildlife Service)

ST. MARTIN'S LOST REPTILES

The species on this page were native to St. Martin, and are now probably gone from the island. The introduced **Small Asian Mongoose** is implicated in the demise of these species on St. Martin. The **Lesser Antillean Iguana** and **Leeward Island Racer** are still present on mongoose-free Anguilla and St. Barts. Other factors, such as habitat destruction and predation by rats probably also contributed to the loss of these species.

While it is difficult to be sure that these species have disappeared from St. Martin entirely, they seem to be functionally extinct here. That is to say, if there are populations remaining, they are too small to play a significant role in the ecosystem and probably too small to sustain themselves in the long term.

Also potentially lost is the **Saint Martin Skink**, a species known only from St. Martin, which was described from museum specimens decades after it was last seen in the wild. The recent discovery of skinks on Tintamarre offers some hope that this species survives. If extinct, it serves as a reminder that our unique natural heritage is vulnerable to human activity, and that we must strive to protect the other species from St. Martin that are found nowhere else in the world. In some cases, that may mean discovering them before it is too late.



Lesser Antillean Iguana (*Iguana delicatissima*)

This iguana has probably been extirpated from St. Martin for decades, although it survives on St. Barths, Anguilla, and several other islands in the Lesser Antilles. It is an endangered species and is threatened by loss of habitat, predation by invasive species, such as feral cats and mongoose, and competition with the **Green Iguana**, which has been introduced in many parts of their range. This iguana also interbreeds with the green iguana, making it difficult to preserve genetically pure populations of this species.

This iguana is easily distinguished from the green iguana by the lack of an enlarged subtympenic scale. On green iguanas, there is a large, round scale on the neck below the ear. Green iguanas also typically have black bands on their tail, while the *I. delicatissima* does not. In areas where the two species interbreed, the presence of hybrids makes it more difficult to distinguish between the two species.

In S.J. Kruythoff's 1938 description of the fauna of the Netherlands Windward Islands, he noted the presence of iguanas on both Saba and St. Eustatius, but not St. Martin, indicating that this iguana may have been extirpated, or very rare by the early part of the 20th century, 50 years after the introduction of the mongoose. Conversely, herpetologist James "Skip" Lazell wrote in 1973 that he had heard it was present in some locations on St. Martin, but was "very rare." He did not personally encounter it while on the island.

As implied by its name (*delicatissima* is Latin for "most delicious"), this species is apparently the tastiest iguana, a fact which probably contributed greatly to its current status as an endangered species.

Although the lizard itself is no longer found on the island, its legacy remains: Guana Bay and Guana Key were probably named after this species. (Photo taken on St. Barts)



Leeward Island Racer (*Alsophis rijgersmaei*)

The only native snake from St. Martin, it is probably extirpated on the island, although populations do remain on Anguilla, St. Barts and some of the larger islets of the Anguilla Bank. From the family Colubridae, it may reach a little over one meter in length. It is non-venomous, and it typically eats insects, frogs and lizards. Like many related snakes in the Caribbean, this species is endangered. This snake is named after Dr. Hendrik van Rijgersma, a physician and naturalist who worked on St. Martin in the late 1800s. Sadly, it was last seen on the island in 1996. (Photo taken on St. Barts by Karl Questel)



AMPHIBIANS

The class Amphibia includes vertebrates with water-permeable skin. Most species have an aquatic juvenile phase before metamorphosing into terrestrial adults. Because of this, most species require fresh water for reproduction and growth and a moist environment as adults to avoid drying out.

These unique characteristics of amphibians make it challenging for them to arrive on islands by natural dispersal. Prolonged exposure to salt water, perhaps while floating on a raft of vegetation, would be deadly in most cases. While there are some amphibians native to the Caribbean, all of the species on St. Martin are believed to be introduced by humans.

Our entire amphibian fauna is just four species of frog, three from the same genus. The whistling frogs of the genus *Eleutherodactylus* have been particularly successful as colonists because their tadpole phase occurs entirely inside the egg. This obviates the need for fresh water for breeding and development, allowing them to survive in relatively dry habitat. They hatch from the egg into tiny froglets.

Our other frog, the **Cuban Tree Frog**, is a highly-successful introduced species that has established itself in many parts of the Caribbean and beyond.



A VULNERABLE CLASS

Amphibians are particularly vulnerable to pollution and environmental toxins, which they absorb through their skin. Because of this, many species worldwide are threatened. In one unused swimming pool, hundreds of physically deformed **Cuban Tree Frogs** were found. Although the cause of the deformities is unknown, it is possible that toxins absorbed during the tadpole phase caused deformities during their transformation into adult frogs.

WHISTLING FROGS

There are three species of small tree frog from the genus *Eleutherodactylus* on St. Martin. They may also be known as **Coquí**, **Robber Frogs** or **Rain Frogs**. There are almost two hundred species in this remarkably diverse genus, many of which live in the Caribbean.

Johnstone's Whistling Frog (*E. johnstonei*) and the **Martinique Robber Frog** (*E. martinicensis*) are very similar in appearance, and the only foolproof way of distinguishing them is by the call of the male frog. Johnstone's frog has been introduced to many islands in the Caribbean and beyond. The Martinique robber frog is native to Martinique, Guadeloupe, Dominica and St. Lucia. It has been introduced to St. Barths and St. Martin. Because half of its native range and both introductions are on French islands, it seems that economic and cultural ties have made it easier for this French frog to hop over to other French islands.

The **Cuban Flathead Frog** or **Greenhouse Frog** (*E. planirostris*) is a more recent arrival, first documented on the island by the author in 2012. Like many reptiles and amphibians, it probably came to the island via Florida, although its native range is Cuba and the Bahamas.

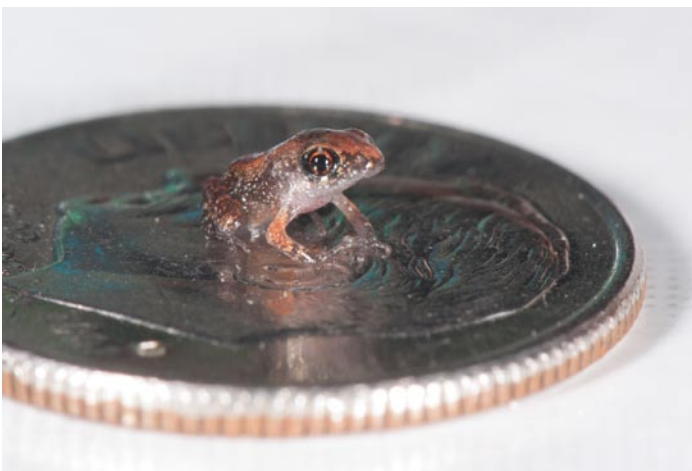
These frogs are most common in moist, forested areas, where they spend their days in the leaf litter or under stones. At night, they are active, hunting for insects and other small prey. Their calls, surprisingly loud for such small frogs, are often heard at night throughout the island. Eggs are deposited in leaf litter or under stones or other debris. These frogs exhibit direct development, meaning the tadpole phase occurs inside the eggs. This adaptation allows them to live in a broader range of places because they do not need fresh water resources to develop.



Johnstone's Whistling Frog (*Eleutherodactylus johnstonei*)
Adults of both *E. johnstonei* and *E. martinicensis* are typically brown in color and may have dark chevrons on their shoulders and sometimes a very thin line down their back.



Immature *Eleutherodactylus* are typically a mottled mix of tan, brown and orange and often have a light patch on the nose.



Cuban Flathead Frog (*Eleutherodactylus planirostris*)
All *Eleutherodactylus* frogs go through the tadpole phase inside the egg, which hatches into a tiny froglet, seen here on a dime for scale.



Cuban Flathead Frog (*Eleutherodactylus planirostris*)
Adults of this species are dark brown with tan markings, including two stripes down their back. Thus far, they have only been seen in Emilio Wilson Park on the Dutch side.

Cuban Tree Frog (*Osteopilus septentrionalis*)

Very large for a tree frog, this species has successfully invaded most of the Caribbean, as well as Florida and even Oahu in Hawaii. It was first recorded on St. Martin in 1987. Today it may be found throughout the island.

Unlike our *Eleutherodactylus* species, this frog does have an aquatic tadpole stage. Tadpoles are typically found, sometimes in great numbers, in any standing water on the island. They are rarely found in roadside ditches, where **Guppies** are common, probably because guppies will eat the young tadpoles. Adults spend their days in tree hollows, water reservoirs in bromeliads and other plants, or in vegetation that provides protection from losing moisture.

Insects probably make up the bulk of the diet for this species, although it is large enough to eat smaller frogs and baby lizards. Tadpoles primarily eat algae, but as they get larger they will eat other tadpoles. Cannibalism at this stage increases the likelihood that some will survive to adulthood in situations where a fresh water resource is overcrowded. It helps some tadpoles develop more quickly, which is useful in situations where a temporary fresh water resource, like a puddle, may dry up.

When originally found on St. Martin this species was misidentified as the **Two-striped Tree Frog** (*Scinax ruber*). Although this was subsequently corrected, many sources still incorrectly claim that the two-striped tree frog is present on St. Martin.



Male cuban tree frogs have raised, dark patches on their thumbs which help them grip females while mating. This species also has very large toe pads to help them cling to leaves and other surfaces.



Young froglets of this species look quite different from adults, and are much smaller, under two centimeters. Adults, by comparison, may be up to twelve centimeters in length.



Bromeliads and other plants which have a water reservoir are a preferred daytime retreat for this species. They may also hide in the hollows of trees or in the folds of **Papaya** (*Carica papaya*) leaves.



Tadpoles may be found in almost any guppy-free fresh water, even shallow puddles. Man-made reservoirs, such as abandoned swimming pools or small drinking ponds for livestock are also used by this species.

FRESHWATER FISH

Although marine life is beyond the scope of this book, there are a few freshwater fish species that live on St. Martin. This is perhaps a bit surprising because St. Martin has very little fresh water, particularly during the dry season. These species are typically also somewhat tolerant of brackish or salt water, allowing them to survive when fresh water is largely unavailable. Some species spawn in the ocean, allowing them to colonize islands. Others have been introduced by humans.

The **Guppy**, also known as the **Millionfish** because of their great numbers, is native to the Caribbean and South America, although it is unclear if it is native to St. Martin. They are an important mosquito control agent, and are often placed in cisterns, ponds and other standing water to eat mosquito larvae.



Guppy (*Poecilia reticulata*)

Guppies are small freshwater fish native to the Caribbean. They are also able to live in brackish water. They help control mosquito populations by eating mosquito larvae.



Guppy (*Poecilia reticulata*)

Guppy populations can be incredibly dense when they are isolated in shrinking pools during dry periods. If their habitat dries up, they will die, but repopulate in the rainy season.



Mountain Mullet (*Agonostomus monticola*)

Sometimes reaching over 30 cm, adults are found in streams, but their eggs travel on ocean currents, perhaps explaining how they can live on an island without year-round streams.



River Goby (*Awaous tajasica*)

Little is known about this bottom-dwelling species. Like our other freshwater fishes, it is probably able to survive the dry season by tolerating brackish water.



Tilapia (*Oreochromis* sp.)

From the chlicid family, tilapia are native to Africa. On St. Martin, they are found in Fresh Pond and many drainage ditches. They are often introduced for mosquito control.



INSECTS

Insects (class Insecta) are the most diverse group of arthropods (phylum Arthropoda), and the most diverse group of animals. Like other arthropods, insects have a hard exoskeleton and jointed legs. Insects have three pairs of legs, three body segments and usually two pairs of wings. The body segments of an insect are head, thorax and abdomen.

Most insects go through some form of metamorphosis. Butterflies, beetles, flies and wasps undergo complete metamorphosis, from egg to larva to pupa to adult. True bugs, grasshoppers, dragonflies and others have an incomplete metamorphosis, from egg to nymph to adult.

No one knows how many insect species live on St. Martin, but it is surely more than 1,000, perhaps several times that many. While a few are widely recognized, the majority go unnoticed by the average resident or visitor.

In this section, and the sections on invertebrates in general, only a small sample of the total species are featured. Included are the most well-known species, as well as others selected to illustrate the diversity of each group.

WHAT'S IN A (COMMON) NAME?

Common names are basically any names that people use for animals, aside from their scientific or latin name. They vary from place to place and language to language, and they don't have any biological significance. There may be many common names for the same animal, or different animals may share the same common name.

Aside from butterflies and insects that are agricultural pests, most insects don't have common names at all. Non-entomologists don't talk about them, so no one ever bothered giving them names.

In this book, I have given common names to insects and other invertebrates that didn't already have one. Since a common name is whatever people call an animal, whatever I call an animal is a common name. Naming these animals makes it easier for ordinary people to connect with them and discuss them. In most cases they are simple and descriptive. A handful of animals are named in honor of donors who helped finance this book, and those are listed in the acknowledgements in the back of the book.

BUTTERFLIES

Of all the invertebrates, butterflies are perhaps the best understood. They are colorful and active during the day, and most people will recognize many of the common butterflies, something that can't necessarily be said for flies or beetles.

On St. Martin, there are at least 35 species of butterfly, most of which are featured here. Although our butterflies are fairly well-understood, it is possible that other species are present on the island waiting to be discovered.

There may have been additional butterfly species on the island in the past. One, the **Zebra Longwing** (*Heliconius charithonia*) apparently lived here until quite recently. Some believe that the spraying of insecticide to control mosquitoes may have contributed to the disappearance of this species on St. Martin. It is quite common on nearby Saba.

Butterflies and moths form the insect family Lepidoptera. Butterflies are typically have clubs at the ends of their antennae. Most butterflies also fold their wings above their back when resting. Butterflies are active during the day, while most, but not all, moths are nocturnal.



Butterfly wings are covered in tiny scales, which give the wings their color. Some colors are achieved with pigments, but most come from microscopic structures that reflect specific wavelengths of light.



Butterflies typically have clubs at the ends of their antennae, and all butterflies have a proboscis that they use when feeding, primarily on nectar. The proboscis is rolled-up when not in use.



Butterflies undergo complete metamorphosis, from egg to caterpillar to chrysalis to adult. The life cycle of the **Gulf Fritillary** is shown here.

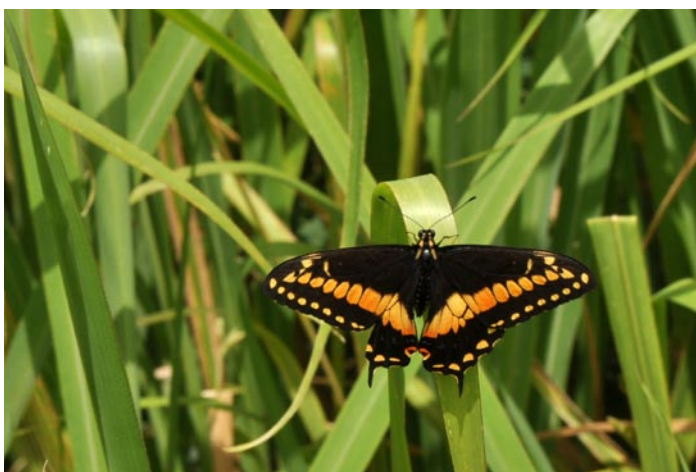


Many butterflies engage in mud-puddling to obtain salts and other nutrients. Congregations of butterflies may be seen on moist soil or dung.

SWALLOWTAILS

Swallowtails are large butterflies from the family Papilionidae. They are frequently yellow and black, and many species have tails that descend from the hindwings.

Not pictured is the **Polydamas Swallowtail** (*Battus polydamas*), which may have lived here in the past, although I have found no records of it in St. Martin. This species is found in most of the Caribbean, including islands as close as the Virgin Islands and St. Kitts. In the Caribbean many islands have distinct subspecies of this butterfly, indicating that populations remain locally isolated. The subspecies on Antigua became extinct, and perhaps the same happened here.



Black Swallowtail (*Papilio polyxenes*)

I have seen this swallowtail only once, on the western slope of Pic Paradis. This species is primarily found in North America, but its range also includes Cuba. This individual would seem to be a vagrant traveling far out of its native range.

BUTTERFLY HOST PLANTS

For many species of butterfly, the caterpillars have a specific plant or family of plants that they prefer to eat. The host plant preference of caterpillars may be very selective or relatively broad, depending on the species. Some caterpillars may even prefer specific parts of a plant, like the seeds, fruit or flowers.

In some cases, plants have developed toxins to discourage animals from eating them, and caterpillars have developed an ability to withstand the toxins, and even retain them to become toxic to predators. These caterpillars typically have bright warning coloration.

Knowledge about caterpillar host plants makes it easier to find caterpillars of various species. Gardening with these plants also tends to attract butterflies, who will come to lay eggs on these plants.



Checkered Swallowtail (*Papilio demoleus*)

Also known as the **Lime Butterfly** or **Citrus Swallowtail**, this species is native to Asia, and has only arrived on St. Martin recently. It was first documented in the Caribbean in 2004 in the Dominican Republic.

Caterpillars of this species feed primarily on plants from the citrus family. One of the primary host plants on St. Martin is the **Mutton Lemon** (*Triphasia trifolia*), which is a shrub native to Asia that is used in decorative landscaping and also grows wild in scrub areas.

Early instars of this caterpillar are brown and white, closely resembling bird poop as a means of camouflage. As they grow larger, they turn green. When threatened, these caterpillars can project two red-orange "horns" from near their head to frighten or confuse predators.

BRUSH-FOOTED BUTTERFLIES

These butterflies are from the family Nymphalidae, which is a large and diverse butterfly family, although the number of species on St. Martin is relatively small. Butterflies from this family may be called brush-footed or four-footed because their front pair of legs is typically smaller than their other pairs.

It is possible that a species of satyrid moth from the genus *Calisto* lived on the island at some point in time, or is still present somewhere in small numbers. There are a number of Caribbean species of these small butterflies, often endemic to specific islands. They typically prefer shady woodland areas, which were largely destroyed during the agricultural era, so it is possible that many species from this genus became extinct at that time.



The monarch chrysalis is green with golden spots and a gold and black line near the base. Near the end of pupation, the chrysalis becomes clear and the butterfly may be seen inside.



The egg of the monarch butterfly is oblong and off-white with ridges running down it. The best way to find a monarch egg is to watch an adult near one of its host plants, it will land briefly on a leaf to deposit an egg.



Adult monarchs are bright orange and black. The South American subspecies tends to be larger and paler.

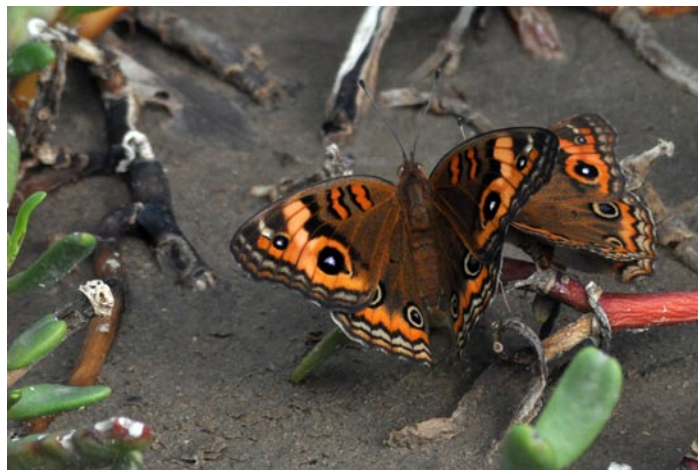
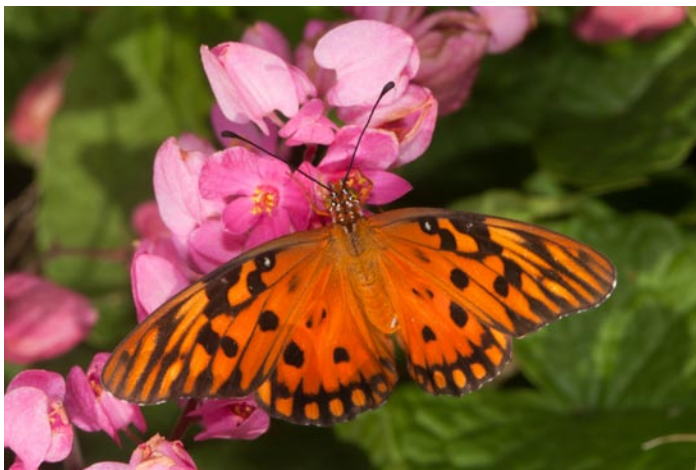


The monarch caterpillar has black, yellow and white stripes, and two black spikes at either end. Its coloration is a warning that it is poisonous, due to toxins from its host plant, primarily **Apple of Sodom** (*Calotropis procera*) on St. Martin.

Monarch (*Danaus plexippus*)

The monarch is a large, orange butterfly commonly seen on the island. Its caterpillars feed on plants from the milkweed family, making them noxious to birds and other predators. There are two recognized subspecies, both of which may occur on St. Martin. Individuals with thicker black lines around the veins of their wings may be hybrids of the two subspecies.

In North America, monarchs will migrate south to overwinter in Mexico and California. Tropical populations of monarch typically do not migrate. Due to our location, populations in the Caribbean may be a mix of local residents and migrants.



Gulf Fritillary (*Agraulis vanillae*)

This butterfly is the only heliconid (subfamily Heliconiinae) on St. Martin. The upper side of its wings is orange with black spots, and the underside is orange-tan with silver spots. The caterpillar is orange and black with several rows of spines.

Caterpillars of this butterfly feed on **Passionfruit** (*Passiflora* spp.) vines. They derive toxins from these plants that make them unpalatable, hence their bright orange and black “warning” coloration.

Tropical Buckeye (*Junonia evarete*) & **Mangrove Buckeye** (*Junonia genoveva*)

These two species are very similar, and are frequently confused with each other, even in scientific literature. Descriptions based on the color and pattern of their wings have been found to be unreliable. Currently the most reliable way to distinguish them is by looking at the underside of their antennae. In the tropical buckeye, the underside of the club at the end of the antennae is black. In the mangrove buckeye, the underside of the entire antennae is a uniform light gray.

Caterpillars of these species are primarily black, with rows of hairy spikes. On the sides, the bases of the spikes are orange, and on the top the spikes are tinged with deep blue. There may be white spots or lines across the back of the caterpillar. Caterpillars of the tropical buckeye are often seen on **Ruellia** (*Ruellia* spp.) plants, while the mangrove buckeye feeds on **Black Mangrove** (*Avicennia germinans*).



White Peacock (*Anartia jatrophae*)

This medium-sized butterfly is white with brown eyespots and markings. It ranges from Argentina to some parts of the southern United States. I often encounter them in or near wetland areas, perhaps because one of their caterpillar host plants is **Water Hyssop** (*Bacopa* spp.). Other known host plants include **Ruellia** (*Ruellia* spp.) and **Lippia** (*Lippia* spp.). This butterfly isn't rare, but I only see it occasionally. Eyespots on a butterfly typically serve to confuse predators and take their attention away from the butterfly's body. For this specimen, they seem to have served their purpose, leaving the wing damaged, but the body intact.



Mimic (*Hypolimnys misippus*)

This butterfly is primarily found in Africa, Asia and Australia, but it is also found in some parts of the Caribbean. Females of this species mimic the **African Monarch** (*Danaus chrysippus*), which is distasteful to birds, like our **Monarch** (*D. plexippus*). Males are black with large, white ovals ringed in blue on the upperside of their wings. Their underside is brown with white ovals. I have only encountered this species once on St. Martin, and it is generally rare in the Caribbean. Some scientists believe this species may have crossed the Atlantic on ships transporting African slaves to the Caribbean.



Painted Lady (*Vanessa cardui*)

The painted lady is a particularly cosmopolitan butterfly species. In fact, in some places they are called the **Cosmopolitan**. They are found on all continents except South America and Antarctica. On St. Martin, I have only seen this butterfly once, and perhaps it was a stray from another island. In some parts of the world this species is migratory, but typically not in warmer climates. If there is a resident population, the caterpillars probably feed on plants from the daisy family (Asteraceae).



Indian Leafwing (*Kallima paralekta*)

This species is native to southern Asia and Indonesia, and looks almost exactly like a dead leaf when its wings are closed. I have only encountered this species once on the island, and it was almost surely an escapee from a local tourist attraction featuring a variety of non-native butterflies. Caterpillars of this species typically feed on plants that are native to Asia. A lack of suitable host plants on St. Martin may serve as a natural barrier preventing this species from becoming established on the island. It has been almost three years since my only sighting of this species, so it seems likely that it was unable to establish a population here.

SULFURS AND WHITES

Butterflies from the family Pieridae are typically white or yellow in color and medium to small in size. They often exhibit sexual dimorphism, meaning that the male and female differ in size, color or markings.

The **Great Southern White** may be the most common butterfly on the island. The population varies seasonally, and there are often huge populations in December and January. Clouds of these butterflies that form around flowering plants are sometimes referred to as “Caribbean snow.”



Cloudless Sulfur (*Phoebis sennae*)

Chrysalids of this species are green, angular and have essentially no markings.



Cloudless Sulfur (*Phoebis sennae*)

The caterpillar of this species is typically bright green, and develops blue and yellow markings as it grows. Its primary host plant is **Candle Bush** (*Senna alata*).



Cloudless Sulfur (*Phoebis sennae*)

The male cloudless sulfur is bright yellow and almost completely devoid of markings.



Cloudless Sulfur (*Phoebis sennae*)

When the caterpillar feeds on the flowers of the candle bush, it becomes yellow with black stripes. Sulfurs typically derive their pigmentation from their larval host plant.



Cloudless Sulfur (*Phoebis sennae*)

The female cloudless sulfur has white spots and pink markings on the underside of its wings.



Great Southern White (*Ascia monuste*)

This species is predominantly white on the upper side of its wings. The male has a yellow underside, while the female has a white underside with dusky gray markings.



Hall's Sulfur (*Eurema leuce*)

A small sulfur with pink markings on the underside of its wingtips.



Great Southern White (*Ascia monuste*)

This species often lays clusters of eggs. It utilizes a wide variety of host plants and is one of the most common, and noticeable butterflies on the island.



Little Yellow (*Pyrisitia lisa*)

Another small sulfur, the male on the left has fewer markings than the female on the right. This species was recently moved from the genus *Eurema*.



Florida White (*Appias drusilla*)

This species is similar in size and appearance to the **Great Southern White**, but is almost completely white. Its wings are also slightly more angular.



False-barred Yellow (*Eurema elathea*)

The underside of this species is predominantly white, but the upper side of the forewing is yellow with a prominent bar in the male.

BLUES AND HAIRSTREAKS

The family Lycaenidae includes a number of small butterflies which may also be called gossamer-winged butterflies. It is a diverse family, with over 5,000 species. On St. Martin, there are at least nine species, but there may be others awaiting discovery. Their small size makes them impossible to differentiate while flying, so up-close examination is critical to identification. The blues typically have metallic blue scales on the upperside of their wings. Hairstreaks are often various shades of brown and most of them have tails on their hindwings. The various species are most easily distinguished by the patterns on the underside of their wings.



Miami Blue (*Cyclargus thomasi*)

This small butterfly has a number of distinct subspecies, ours is probably *woodruffi*. In the males, the upper side of the wings is a bright powder blue, and in the females it is a dark gray with some blue on the interior of the wings near the body. Due to their small size and similar coloration, it can be difficult to distinguish the three species of blues on St. Martin.

The caterpillar of this species commonly feeds on **Balloon Vine** (*Cardiospermum corindum*). Like most lycaenid butterflies, the caterpillars of this species are often tended by ants. In this symbiotic relationship, the ants offer protection to the caterpillar, and the caterpillar secretes a sugary liquid for the ants.

The subspecies found in Florida, *bethunebakeri*, is considered to be endangered. It is restricted to a single colony on Bahia Honda Key in the Florida Keys.

This species is also known as **Thomas's Blue**, and some may use the name **Miami Blue** to refer specifically to the endangered Florida subspecies.



Hanno Blue (*Hemiargus hanno*)

This blue is widespread in the Caribbean and often common throughout its range. On St. Martin it is seen year-round, often in large numbers. In general, they prefer hot, sunny weather.

In the female, seen above, the upper side of the wings is gray with blue in the center. In the male, the wings are blue with a thick black border around the outer edge. The pattern on the underside of the wings is the easiest way to distinguish them from similar blues and hairstreaks on the island.



Disjunct Scrub Hairstreak (*Strymon bubastus ponce*)

This hairstreak has no tails on its hind wings and closely resembles our blues. Both sexes have a gray-brown upper side with two dark spots on the bottom of the hind wing. It is also known as the **Bubastus Hairstreak**. It is found from Puerto Rico through the Lesser Antilles, and a separate subspecies lives in South America.

Although it is very common, little is known about this species. Even its basic life history and information such as the larval host plants is unknown.

Gray Ministreak (*Ministrymon azia*)

This butterfly is even smaller than the rest of our diminutive lycaenids. The upper side of its wings is light brown, and the under side is silver with a jagged, bright orange line.

The caterpillars of this species feed on the flower buds of **Mimosa** (*Mimosa* spp.) trees.

MARGARET FOUNTAINE

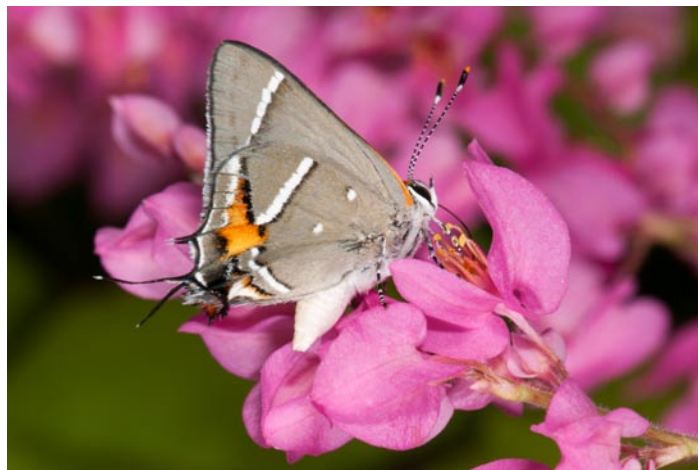
Born in 1862, Margaret Fountaine was one of the few female lepidopterists of her time. She traveled much of the world, including multiple visits to the West Indies. She often reared her butterfly specimens from eggs or caterpillars, so the 22,000 specimens in her collection were in excellent condition. She also painted many of the caterpillars she reared. Even today, entomologists consult these paintings to identify caterpillars.

In 1940, she died of a heart attack while collecting butterflies on Mount St. Benedict in Trinidad. Her detailed journals, starting from the age of fifteen, remained unopened until 1978 at her request. Since then, they have been studied extensively as a unique window into the life of a female Victorian naturalist and world traveler.



Cassius Blue (*Leptotes cassius*)

This small blue lays eggs on the flowers of a variety of host plants, and the caterpillars feed on the flowers and seed pods of their host. Also known as the **Tropical Striped Blue**.



Bertram's Scrub Hairstreak (*Strymon acis*)

Noticeably larger than our other hairstreaks, the caterpillars of this species feed on **Croton** (*Croton* spp.).



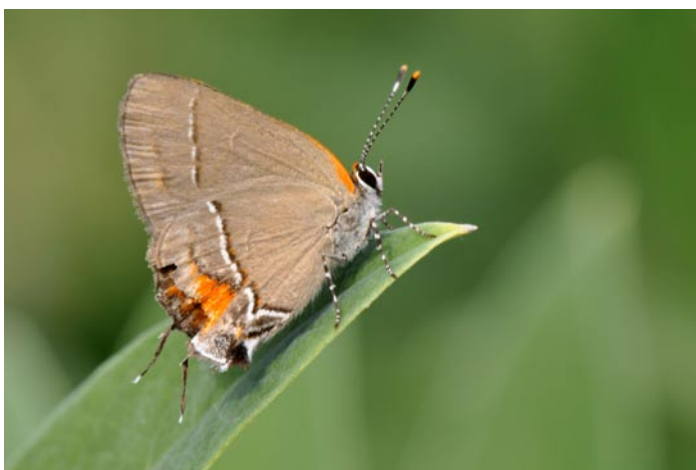
Columella Scrub Hairstreak (*Strymon columella*)

Also known as **Hewitson's Hairstreak**, **Modest Hairstreak** and **Mallow Hairstreak**, our subspecies is found from Puerto Rico to Antigua.



St. Christopher's Hairstreak (*Chlorostymon simaethis*)

Easily identified by the green underside, the caterpillars of this species are known to feed on the fruit of the **Balloon Vine** (*Cardiospermum* spp.).



Angerona Hairstreak (*Electrostrymon angerona*)

This species is found only in the Lesser Antilles. The upper side of the wings is a tan color similar to the under side.



Hairstreak Caterpillar

Lycaenids often have unusual-looking caterpillars. Many are oblong and hairy with their head hidden by the rest of their body. Identifying them to species is often difficult.

SKIPPERS

This butterfly family, Hesperiidae, is distinct from all other butterflies. They have thick bodies, stronger wing muscles and their antennae curve at the tips. Their wings are relatively small compared to the size of their bodies.

St. Martin is home to a relatively large number of skipper species. Not pictured is one species probably from the genus *Euphyes*, which I have only seen on a few occasions.



Dark Longtail (*Urbanus obscurus*)

This species is easily distinguished from our other tailed skipper by its drab coloration and shorter tails. It is also known as the **Stub-tailed Skipper**. This skipper is found only in the Lesser Antilles, and St. Martin is the northernmost island in its known range.

This skipper is most commonly encountered feeding at flowers in clearings on hillsides, particularly Pic Paradis. Caterpillars are yellowish brown with tiny black dots, a thin black line down the back and a light line down the side. The head is dark brown. Caterpillars are known to feed on **Comb Hyptis** (*Hyptis pectinata*).



Long-tailed Skipper (*Urbanus proteus domingo*)

This skipper has long tails and iridescent green-blue on its body and the interior portion of its wings. This species is found from North America to Argentina. Our subspecies is found only in the West Indies.

Caterpillars of this species may feed on a wide variety of legumes (family Fabaceae). Upon reaching maturity, they will use silk to wrap themselves inside a leaf and pupate.

Adults are commonly seen in forest clearings where they feed on the nectar of a variety of different flowers.



Hammock Skipper (*Polygonus leo*)

This very common skipper gets its name from its habit of resting on the underside of leaves. It is somewhat similar in appearance to the **Long-tailed Skipper**, but it has no tails and the blue-green sheen is limited to the middle part of its back. The underside of this species is brown with a purple tinge.

Caterpillars are yellow-green with a very large head and are known to feed on **Jamaican Dogwood** (*Piscidia piscipula*).

Caribbean Duskywing (*Ephyriades arcas arcas*)

This skipper is often seen in shady areas of scrub or forest. It is also known as the Hairy Dusky Wing. It ranges from Central America to Brazil, but was first discovered in St. Kitts. Our subspecies is found only in the Northern Lesser Antilles.

Males and females of this species differ significantly in their appearance. Males appear black, but have a blue-purple iridescence when reflecting light at the right angle. Females are a mottled brown. A difference in form between the two sexes of the same species is called sexual dimorphism.



Tropical Checkered Skipper (*Pyrgus oileus*)

Most often seen sunning on the ground or low-lying vegetation or feeding at flowers. Caterpillars feed on mallows (family Malvaceae).



Zestos Skipper (*Epargyreus zestos*)

Relatively uncommon on St. Martin, I have only seen this skipper in clearings and roadsides along the central crest of the island.



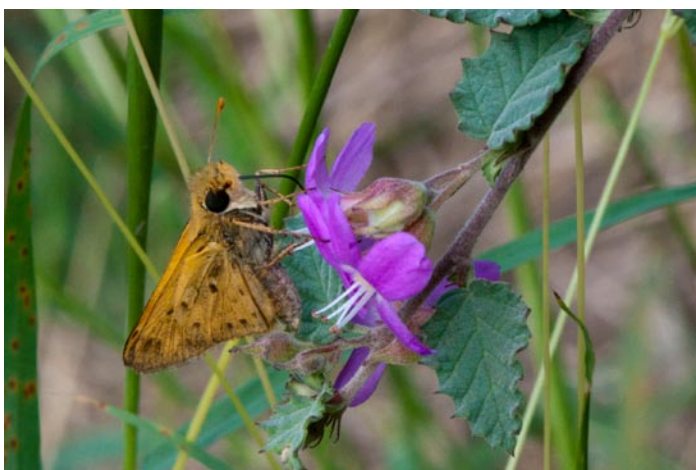
Purple-washed Skipper (*Panoquina lucas*)

This common skipper is also known as the **Sugar Cane Skipper**, and its caterpillars feed on **Sugar Cane** (*Saccharum* spp.) and other grasses.



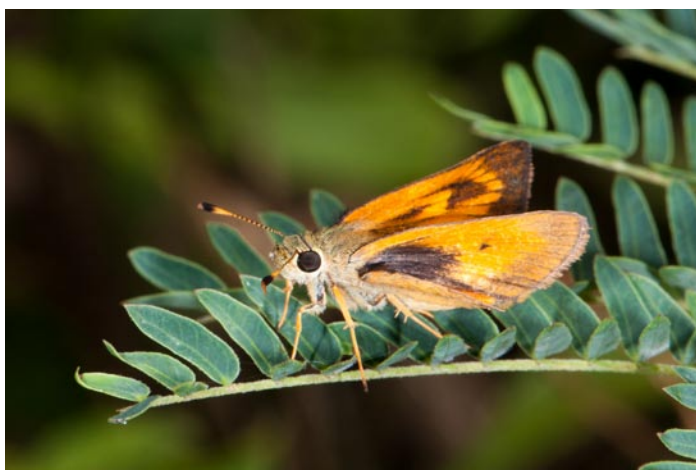
Obscure Skipper (*Panoquina panoquinoides*)

Caterpillars of this species feed on **Cordgrass** (*Spartina* spp.) and other salt-tolerant grasses, and I have only seen it in near Étang de la Barrière in Cul-de-Sac.



Fiery Skipper (*Hylephila phyleus*)

Similar in appearance to the **Vitellius Skipper**, but much less common on St. Martin, this skipper can be identified by the dark spots on the underside of its wings.



Vitellius Skipper (*Choranthus vitellius*)

Also known as the **V-mark Skipper**, it has a dark, v-shaped mark on the forewing. The underside of the wings are solid orange. This skipper is very common on St. Martin.



MOTHS

Moths make up the majority of species in the order Lepidoptera. In many ways, one could think of butterflies as a specialized group of moths that tend to be active in the day and share a few other characteristics. Many moths are nocturnal and drab in color, but there are also many exceptions.

On St. Martin, there are probably several hundred species of moth from many different families. Perhaps the easiest way to see a variety of moths and other nocturnal insects is to leave a light on outside and watch what it attracts. Look closely, even moths that look brown and uninspired often have intricate patterns on their wings.

Like butterflies, moths undergo a complete metamorphosis, from egg to caterpillar to cocoon to adult. Unlike butterflies, most moths spin a pouch of silk around their pupa, which is called a cocoon. Some moths feed on flower nectar like butterflies, while others prefer different types of food. Some may not eat at all as adults, emerging from their cocoon just to mate, lay eggs and die.

I do not know of any moths that are endemic to just St. Martin. Because they can fly, most species have a relatively large native range.

Black Witch (*Ascalapha odorata*)

Although it appears black or dark brown in flight, this moth, pictured above, is quite beautiful when viewed close-up. It is relatively common in forested ravines. Typically well-camouflaged when resting on rocks or trees, they break into flight when approached.

This moth has a variety of names, including **Bat**, **Duppy Bat** and **Money Moth**. There is a great deal of folklore associated with this moth, and its significance varies from region to region. In some cases it may be a bad omen, portending death. In other areas, it may be a sign of good luck, such as receiving a large sum of money. Also known as the **Sorrow Moth**, some believe these moths embody the soul of a recently deceased loved one.

Adult moths feed on the juices from rotting fruit, and the caterpillars feed on the leaves of a variety of host plants, including many legumes (family Fabaceae). This moth is found from Brazil to the southern US.

EREBID AND NOCTUID MOTHS

Until 2010, many moths were collected in the family Noctuidae. Today, they are split into four families, including Erebidae and Noctuidae. The distinguishing physical characteristics are subtle, and relate to the arrangement of veins in the wings. The underlying reason for the rearrangement is to organize the various species into groups that reflect how closely related the species are to each other. DNA analysis is used to confirm or reject these arrangements.

Of the species included in this book, the vast majority are now considered part of the family Erebidae. Only the last two species in this section, the **Forage Armyworm** and **Velvet Armyworm**, remain in the family Noctuidae.

Moths from the erebid subfamily Arctiinae are somewhat unique. They are often active during the day and many are brightly colored. A number of species mimic wasps to avoid predation.

This family is distinguished by the presence of an organ on the thorax that produces ultrasonic sounds. These sounds are used in courtship, and in some cases to avoid predation by bats, who use ultrasonic sounds to locate their prey.



Texas Wasp Moth (*Horama panthalon panthalon*)

This species mimics paper wasps from the genus *Polistes*, which on St. Martin would be our infamous **Jack Spaniard** (*Polistes crinitus*). The mimicry is far from perfect, but it does make for a rather unique looking moth.

The subspecies on St. Martin ranges from the Caribbean to northern South America. It is typically active during the day, feeding on flower nectar.

Ornate Moth (*Utetheisa ornatrix*)

This moth is active during the day, typically seen in fields. The wing coloration of this species is highly variable. Although the red and black markings around the border of the wings are typically present, the interior of the forewing may vary from all-white to predominantly red. Even within the population on St. Martin, coloration is widely varied.

The caterpillar of this moth feeds on wild pea plants from the family Fabaceae. They derive a toxin from these plants that protects them from predation, and accordingly have orange and black warning coloration. The seeds of the peas have a higher concentration of poisonous alkaloids, so the caterpillars are most frequently found inside the pea pods eating the seeds.



Spotted Oleander Caterpillar Moth (*Empyreuma affinis*)
This moth is a mimic of the tarantula-hunting wasp *Pepsis rubra*. It is active during the day and is often mistaken for a butterfly.



Ommatochila Moth (*Ommatochila mundula*)
This small moth ranges from the southeastern United States, through the West Indies and into South America.



Spotted Oleander Caterpillar Moth (*Empyreuma affinis*)
Eggs are found in clusters on **Oleander** (*Nerium oleander*) leaves. Freshly-laid eggs are yellow, and before hatching they become transparent and the caterpillars can be seen inside.



Eulepidotis Moth (*Eulepidotis addens*)
Caterpillars of this moth are thought to feed on the **Ice-cream Bean** (*Inga edulis*) and related trees.



Spotted Oleander Caterpillar Moth (*Empyreuma affinis*)
As one might guess, the caterpillar of this moth feeds on **Oleander**. Toxins from the oleander make them poisonous, which they advertise with their bright color.



Brown Leaf Mimic (*Metallata absumens*)
True to its name, this moth is incredibly camouflaged when resting on the forest floor.



January Melipotis Moth (*Melipotis januaris*)

The markings on this moth follow the same pattern, but vary greatly in intensity between individuals.



Lesmone Moth (*Lesmone formularis*)

Another moth that is quite variable in color, it ranges from cream-colored to a dark gray-brown.



Famelica Melipotis Moth (*Melipotis famelica*)

This moth is often attracted to lights at night, but may also be seen on rocky beaches, presumably hiding in crevices between the rocks during the day.



Hieroglyphic Moth (*Diphthera festiva*)

Named after the distinctive, colorful pattern on its wings, this moth is primarily found in tropical and subtropical areas.



Owlet Moth (*Isogona scindens*)

This moth is another very effective dead leaf mimic.



Hieroglyphic Moth (*Diphthera festiva*)

Caterpillars of this moth feed on a variety of host plants, including legumes (family Fabaceae) and mallows (family Malvaceae).



Striped Grass Looper (*Mocis latipes*)

This moth may be seen at night feeding on the nectar of the **Bellyache Bush** (*Jatropha gossypifolia*).



Forage Armyworm Moth (*Leucania subpunctata*)

Also known as the **White-dotted Wainscot**, caterpillars of this moth primarily feed on grasses.



Antillean Grass Looper (*Mocis antillesia*)

Unlike many of the moths in this section that range from the US to South America, this species is found only in the Caribbean.



Velvet Armyworm Moth (*Spodoptera latifascia*)

This large moth is named after its caterpillar. The caterpillars are often found in groups and, after eating all available food, the “army” will move on to a new area.



Velvetbean Moth (*Anticarsia gemmatilis*)

Caterpillars of this moth eat the **Velvetbean** (*Mucuna pruriens*) and a number of other plants. In North America, these moths migrate north during the summer.



Velvet Armyworm (*Spodoptera latifascia*)

On St. Martin, this caterpillar is often found on **Bellyache Bush** (*Jatropha gossypifolia*), but it is also known to eat vegetable plants, such as tomato and eggplant.

GEOMETER MOTHS

The family Geometridae gets its name from the caterpillars, often called inchworms, which walk in a way that looks like they are measuring the earth they are walking on. The name comes from the Greek for the earth (geo) and to measure (metron).

These moths typically rest with their wings spread flat, and many species have angular wing edges. They are primarily nocturnal and often have wavy patterns on their wings to help them blend in to their surroundings.



Looper Moth (*Sphacelodes vulneraria*)

Found from the US through the Caribbean and down to South America, this moth can be identified by the light-colored triangles on the leading edge of the forewing.



Southern Emerald Moth (*Synchlora frondaria*)

This small, pale green moth is often attracted to lights at night. A related species, *Synchlora cupedinaria*, is similar in appearance but has a red border around the wings.



Bardfield's Geometrid (*Semiothisa everiata*)

This species is cream with wavy tan markings. Individuals vary in the intensity of their markings, which may be quite pale.



Emerald Moth (*Synchlora* sp.)

Caterpillars of *Synchlora* moths often camouflage themselves with bits of dead plant matter. This caterpillar is often found on **Bellyache Bush** (*Jatropha gossypifolia*).



Slender Geometrid Moth (*Eumacrodes yponomeutaria*)

These moths have very narrow wings, which makes them look quite different from our other geometrids.

GRASS MOTHS

Moths from the family Crambidae are typically small, but often quite beautiful. They are also known as crambid snout moths because many have a snout on the front of their face. There are many species on St. Martin.

Many crambid caterpillars are agricultural pests, boring into grasses like grains and sugar cane or eating the leaves of squash and melon. Because of this, many of them are named after the crops they destroy.



Grass Webworm (*Parapediasia ligonella*)

Although less than one centimeter in length, this moth is intricately patterned. It is normally found resting on leaves in shady areas.



Caper-leaf Webworm Moth (*Dichogama redtenbacheri*)

Many crambid moth caterpillars are called webworms or leaf-rollers because they use silk to bend or join leaves of their host plant to create a hiding place where they feed.



Orange-spotted Flower Moth (*Syngamia florella*)

This moth often feeds on flower nectar during the day. It is also known as the **Red-waisted Florella Moth**.



White-roped Glaphyria (*Glaphyria sequistrialis*)

This moth is very small, with a wingspan just a bit over one centimeter.



Pickleworm (*Diaphania nitidalis*)

The pickleworm feeds on squash, melon and cucumber plants. The tufts on the abdomen are called hair pencils and females use them to spread pheromones to attract males.



Leaf Skeletonizing Crambid Moth (*Eulepte gastralis*)

This moth is found on the underside of leaves in the forest and is not typically attracted to lights at night. Caterpillars skeletonize leaves, eating the tissue, but leaving the structure.



Checkered Apogeshna Moth (*Apogeshna stenialis*)

The species name may be derived from an ancient Greek festival called Stenia, thought to involve snakes and phallic objects. Perhaps the wing pattern suggests these things.



Bean-leaf Webworm Moth (*Omiodes indicata*)

Caterpillars of this species feed on a variety of bean plants from the family Fabaceae. They also feed on **Tobacco** (*Nicotiana tabacum*) plants, St. Martin's first cash crop.



Palpita Moth (*Palpita isoscelalis*)

Palpita flegia, a very similar species with a silver line on the leading edge of the wings is also found on the island.



Psara Moth (*Psara dryalis*)

Caterpillars of this moth probably feed on grasses. Moths of this genus may be pests of rice and grains.



Lypotigris Moth (*Lypotigris fusalis*)

This small crambid is seasonally quite common in mangrove wetlands. It is also attracted to lights at night. Unlike many crambids, its wingtips are smoothly rounded.

OTHER MOTHS

This section begins with the **Sphinx Moths** (family Sphingidae), which are typically large moths with stout bodies. They beat their wings rapidly and some are able to hover while sipping nectar from flowers, much like hummingbirds. They are also sometimes known as **Hornworms** because their caterpillars typically have a prominent horn-shaped protrusion.

The remaining moths in this section are from a variety of families. Many of them are quite small and are sometimes referred to as micromoths. The term micromoth has no specific scientific meaning, but can be a useful way to describe moths that are tiny, difficult to identify and often poorly understood.



Mournful Sphinx (*Enyo lugubris*)

This small sphinx has intricately shaped and patterned wings designed to provide camouflage. The male has tufts of hair-like scales on the tip of its abdomen, as seen here.



Tetrion Sphinx (*Pseudosphinx tetrio*)

This moth is best known for its caterpillar, which can be very large, over 12 cm. They typically feed on **Frangipani** (*Plumeria rubra*), and may defoliate the entire tree.



Ello Sphinx (*Erinnyis ello*)

This sphinx has bright pink on its hind wings and gray and black bars on its abdomen. The caterpillars feed on **Papaya** (*Carica papaya*) and a variety of other plants.



Rustic Sphinx (*Manduca rustica harterti*)

This sphinx has a beautiful caterpillar. Our subspecies is found only in the Caribbean. The adult is brown with a mottled white pattern on its wings.



Bagworm Moth

From the family Psychidae, these caterpillars build a case for themselves from bits of grass or other material. When ready to pupate, they climb a tree or wall and affix their case to it.



Pink Bollworm (*Pectinophora gossypiella*)

Native to Asia, this caterpillar lives inside cotton bolls, eating the seeds and destroying the cotton. Its arrival in 1922 helped put an end to St. Martin's cotton industry.



Many-plumed Moth (*Alucita* sp.)

These moths, from the family Alucitidae, have wings made up of a number of spines with bristles on either side, similar in structure to bird feathers.



Tortrix Moth (*Ancyli virididorsana*)

This tiny moth may easily go unnoticed when resting on leaves in the forest. It is a member of the family Tortricidae, which includes many fruit tree pests.



Heliodinid Moth (Family Heliodinidae)

These tiny moths have narrow wings and sit with their hind legs outstretched. They often have brightly colored, metallic wings with spots or other patterns.



Miraculous Idiogloss Moth (*Idioglossa miraculosa*)

From the family Batrachedridae, the caterpillars of this strange moth feed on grasses, creating a white patch on either side of the central vein on a leaf of grass.



Plume Moth (Family Pterophoridae)

These moths have long, thin wings divided into feather-like sections. They also many spurs protruding from their legs.



OTHER INSECTS

The other insects of St. Martin include enough species to fill several books, so it's not exactly fair to group such a diverse array of animals into so few pages. On the other hand, many of these species are poorly understood. They can be difficult to identify, and in many cases we know little about their life history. Scientists may not know what they eat, what their eggs or larvae look like and other basic information.

Insects in this section are grouped by order, which is the largest set of scientific classifications within insects. Insects within each order may be quite different from each other, but they will also share common characteristics, such as the type of metamorphosis, the number of wings they have or how their mouthparts work.

Because insects are so diverse, and poorly understood compared to larger animals, our classifications are still changing, sometimes in dramatic ways. At the time of writing, this book reflects our current knowledge of insects and how they are related to each other, but within a few years, or even a few months, new discoveries will probably prompt us to rethink what we know of insects yet again.

Mango Longhorn (*Trachyderes succinctus*)

Pictured above, this cerambycid beetle is often attracted to ripe mango and cashew fruit. It is found in the Central America, South America and the Caribbean.

WHO'S A PEST?

I refer to a number of species in this book as agricultural pests. This sounds bad, and that's a bit unfair. Typically insects we consider pests are just ones that happen to like eating the plants we like to grow.

On one hand, it is reasonable to say that the **Pink Bollworm** helped cause the downfall of the cotton industry in St. Martin, but it wouldn't have even gotten here from Asia without human help. In many cases, humans brought these "pests" to the island.

In a normal ecosystem, plants and animals keep each other in balance. Intensive agriculture is ecologically far from normal. By growing large quantities of the same plants, we are the ones creating the conditions where abnormal quantities of the insects that eat them can thrive. Pests are only pests from our point of view, and usually we're the ones that turned them into pests.

BEETLES

The beetles are the most diverse group of animals in the world, making up about one quarter of known animal species. They undergo a complete metamorphosis, and their larvae are typically known as grubs. Beetles have adopted many different life styles and there are species adapted to eat pretty much every conceivable type of food, including leaves, wood, dung, fungus, carrion and other insects.

This section includes just a small fraction of the incredible diversity of beetles on St. Martin. As with many other insects, few details are known about many species, unless they are a significant agricultural pest.



Elaphidion Longhorn (*Elaphidion glabratum*)

This genus is most diverse in the West Indies, where there are a number of endemic species. Although common, this genus is poorly understood.



Striped Longhorn (*Oxymerus aculeatus*)

This cerambycid beetle is known to be active during the day and may be seen visiting flowers. This species may be spread by humans. Larvae feed on **Mimosa** (*Mimosa* sp.) wood.



Cryptic Flat-faced Longhorn (*Amniscus praemorsus*)

This member of the subfamily Lamiinae is colored to be camouflaged on tree bark. Its larvae may feed on the wood of **Manchineel** and possibly **Breadfruit** (*Artocarpus altilis*).



Ten-spotted Longhorn (*Eburia decemmaculata*)

This beetle is found only in the Lesser Antilles and is quite common on St. Martin. Its larvae are known to feed on **Manchineel** (*Hippomane mancinella*).



Michelle's Metallic Longhorn (*Solenoptera chalumeau*)

This specimen was found on the forest floor during the day in the northeastern corner of the island. It is endemic to St. Martin and its larvae consume decomposing wood.



Polka Dot Tortoise Beetle (*Chelymorphism cribaria*)

When threatened by ants, these beetles press themselves against the leaf and their “shell” protects them from predation.



Caribbean Flea Beetle (*Disonycha spilotrachela*)

This beetle is endemic to the Caribbean. There are several similar species on St. Martin.



Red-shouldered Leaf Beetle (*Chalepus sanguinicollis*)

This oddly-rectangular beetle is a member of the same sub-family (Cassidinae) as the tortoise beetles.



Case-bearing Leaf Beetle (*Cryptocephalus krugi*)

Beetles from the genus *Cryptocephalus* derive their name from the fact that their head is often hidden beneath their thorax. There are over 300 species in this genus.



Toensmeier's Flea Beetle (*Omophoita albicollis*)

This beetle feeds on **Verbena** (family Verbenaceae) and other plants. One of many flea beetle species in the Caribbean, these beetles will jump to avoid predators.



Cowpea Weevil (*Callosobruchus maculatus*)

Although it is called a weevil, this small beetle is actually a member of the leaf beetle family Chrysomelidae. It does typically feed on seeds and beans.



Green Broad-nosed Weevil (*Polydrusus* sp.)

The body of this weevil (family Curculionidae) is covered in small scales that give it a fuzzy appearance.



Brentid Weevil (*Brentis* sp.)

Brentid weevils (family Brentidae) are often quite elongated, with very long snouts. They often eat wood, a diet called xylophagy.



Sugarcane Root Borer (*Diaprepes abbreviatus*)

As its name suggests, this species is a sugarcane pest. It is also a pest of citrus, potatoes and other plants. This species is native to the Caribbean.



Carrot Scarab (*Tomarus cuniculus*)

A medium-sized scarab beetle (family Scarabidae) that may be seen when it is attracted to lights at night. Larvae of this genus feed on plant roots.



Rice Weevil (*Sitophilus oryzae*)

This tiny weevil is the one that you may find infesting your rice, pasta or other grains. It is found, along with its cousin *S. zeamais*, in most warm parts of the world.



Gazelle Scarab (*Onthophagus gazella*)

Also known as the **Brown Dung Beetle**, larvae of this small scarab feed on cow droppings. It is native to Africa, but is now common in many tropical and subtropical areas.



Red-headed Firefly (*Photuris* sp.)

Females of this firefly species may mimic the flashing patterns of other fireflies to lure males and eat them. Fireflies that do this are known as femme-fatale fireflies.



Cactus Lady Beetle (*Chilocorus cacti*)

These beetles are found in many arid habitats in North America. They can be distinguished from similar species by their red underside.



Dixon's Striped Firefly (*Aspisoma ignitum*)

This firefly is relatively common on St. Martin and may be seen when attracted to lights at night, or on vegetation during the day.



Small-spotted Psyllobora (*Psyllobora parvinotata*)

These ladybugs are incredibly small, just a 2-3 millimeters in length. Presumably their prey consists of minute insects.



Firefly Larva (Family Lampyridae)

Firefly larvae are typically specialized predators. This larva was found under tree bark, and presumably preys on other invertebrates that live in the same place.



Ladybug Larva (Family Coccinellidae)

Ladybug larvae are often considered beneficial insects because they consume aphids, scale insects and other insects that are considered agricultural pests.



Mudflat Tiger Beetle (*Cicindela trifasciata*)

These fast-moving beetles hunt on mudflats and beaches. From a distance they may appear to be flies. They are common on the beach near Cul-de-Sac.



Sap Beetle (*Lobiopa insularis*)

These small beetles are found under tree bark, where they consume sap or decomposing vegetable matter.



Water Scavenger Beetle (*Tropisternus lateralis*)

This beetle may be seen swimming in roadside ditches and other freshwater environments. They may also be attracted to lights at night.



Powderpost Beetle (*Xylomeira tridens*)

These beetles, from the family Bostrichidae, typically consume wood and are easily recognized by their cylindrical shape and the bumps on their front and back ends.



Giant Water Scavenger Beetle (*Hydrophilus* sp.)

Unlike the scavenging adult, these huge larvae are predators who may feed on tadpoles, small fish, snails and aquatic insects.



Red-legged Ham Beetle (*Necrobia rufipes*)

This beetle is primarily a carrion eater, but will also eat stored meats, as its name suggests. It is extremely common on carcasses, even those which are mostly decomposed.

NEUROPTERANS

Insects from the order Neuroptera may superficially resemble dragonflies or mantids, but they are not closely related to those groups. They undergo a complete metamorphosis, and most of their larvae are predators.

Flash photography reveals that their eyes typically generate starburst reflections, often in a rainbow of colors. The complexity of neuropteran eyes may be related to the fact that they need excellent vision to find prey. Owlflies, for example, have double eyes, and the front portion of each eye can see in the ultraviolet range.



Four-spotted Owlfly (*Ululodes quadripunctatus*)

This insect is typically found on a twig, and typically has its abdomen extended outward. This strange posture may make it less recognizable to predators.



Stevens's Mantidfly (*Leptomantispa pulchella*)

Typically seen on the underside of leaves in the forest, this species is not related to praying mantises, but does have similar forelegs, which it evolved independently.



Nuzum's Antlion (*Myrmeleon insertus*)

Adult antlions are most commonly seen when they are attracted to lights at night. They look a bit like a dragonfly or damselfly, but fold their wings back against their body.



Green Lacewing (*Chrysopa* sp.)

Lacewing larvae are flightless and roam on vegetation to find their prey. The larvae of many species will affix the exoskeletons of their prey to their backs as camouflage.



Nuzum's Antlion Larva (*Myrmeleon insertus*)

Antlion larvae dig funnels in sand or loose soil and wait at the bottom for ants to fall in. Look for their funnels in dry, sandy areas, like the base of a tree.

ANTS, BEES AND WASPS

These insects are members of the family Hymenoptera, a name derived from the latin words for membrane and wing. Most species have four wings, and small hooks called harmuli lock the front and rear wings together. Most species also have an ovipositor (egg-laying organ) at the end of their abdomen, and in many species it is specially adapted into a venom-injecting stinger.

Many hymenopteran species are social insects, living together in a hive or colony. In some cases, different members of the colony are physically different and play different roles, such as a queen laying eggs, soldiers defending the nest and workers collecting food. Other species are solitary, including a great diversity of parasitic species, many adapted to specific host animals.



Trap Jaw Ant (*Odontomachus* sp.)

These large ants have long mandibles that they use to capture prey. The jaws are triggered by sensitive hairs and close over 2000 times faster than the blink of an eye.



Red Imported Fire Ant (*Solenopsis invicta*)

These ants build dirt mounds for their colonies. When disturbed, the ants will swarm on a threat – like your leg – and release pheromones as a signal to bite all at the same time.



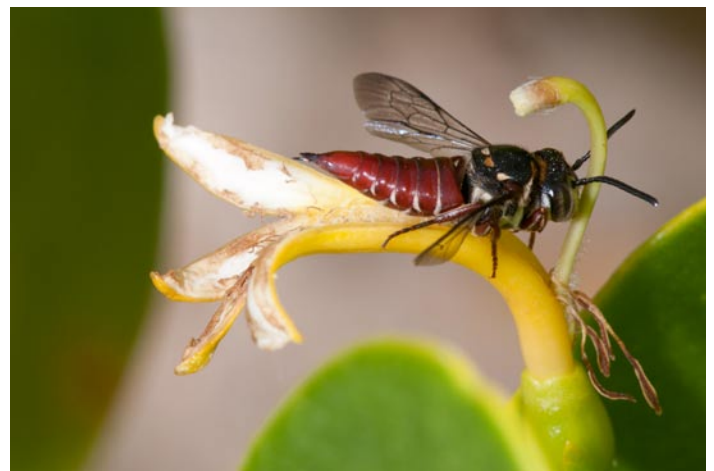
Crazy Beach Bee (*Centris decolorata*)

Many bees in this genus are specialized to collect plant oils rather than, or in addition to, nectar or pollen. They nest in tunnels they dig into the sand on beaches.



Antillean Carpenter Bee (*Xylocopa mordax*)

This huge, black bumblebee chews tunnels in wood for a nest. It is often seen at large flowers, like **Passionfruit** (*Passiflora* sp.) and **Beach Morning Glory** (*Ipomoea pes-caprae*).



Cuckoo Bee (*Coelioxys* sp.)

These small bees look like wasps. They used their pointed abdomen to break open the nests of other bees, typically **Mason Bees** (*Megachile* sp.), to lay their own eggs.



Jack Spaniard (*Polistes crinitus*)

This wasp builds nests of paper made from plant fibers and their saliva. When guarding their nests they are very aggressive and will not hesitate to sting you right on your face.



Clayman's Mud Dauber (*Sceliphron assimile*)

These wasps build nests from mud. They are primarily black, with a very long, thin waist. This waist is part of the abdomen and is known as a petiole.



Orange-horned Tarantula Hawk (*Pepsis ruficornis*)

These wasps are often found consuming nectar on flowers, but females will paralyze tarantulas, put them in a burrow and lay an egg on them. The larva feeds on the spider.



Thread-waisted Hunting Wasp (*Prionyx thomae*)

In the photo, this wasp is caught in a spider web. Females hunt grasshoppers, paralyze them and then dig burrows in soil and leave the grasshoppers there with an egg.



Red-winged Tarantula Hawk (*Pepsis rubra*)

This species also hunts tarantulas to feed their larvae. Above it can be seen dragging a paralyzed tarantula (*Cyrtopholis* sp.) to a burrow it has made.



Sand Wasp (*Stictia signata*)

These wasps dig tunnels in sand where they raise their larvae. Although they are not social wasps, many may nest near each other if there is a particularly good patch of sand.



Scarab-hunter Wasp (*Campsomeris dorsata*)

There are several species from this genus on St. Martin. Adults feed on nectar, but they provide their larvae with insects, especially the larvae of scarab beetles.



Ophionid Wasp (*Enicospilus flavus*)

These wasps are often seen in groups on the underside of leaves in forested areas. They parasitize caterpillars.



Thick-legged Wasp (*Conura* sp.)

Tiny wasps from this genus parasitize other insects, including butterfly chrysalids, beetle larvae and even the larvae of other parasitic wasps.



Red Braconid (Family Braconidae)

Braconidae is a large family of parasitic wasps. They are very diverse and in many cases are impossible to identify by photographs alone.



Ensign Wasp (*Evania appendigaster*)

This wasp lays its eggs in the oothecae (egg-cases) of cockroaches. When walking, it bobs its triangular abdomen up and down.



Aphid Parasite Wasp (*Lysiphlebus testaceipes*)

This wasp, in the upper left of the photo, specializes in parasitizing aphids, seen here with **Oleander Aphids** (*Aphis nerii*). Larvae grow inside living aphids, eventually killing them.

FLIES AND MOSQUITOES

The family Diptera includes flies and mosquitoes. Often thought of as pests, flies are incredibly diverse and many are beneficial as predators of other insects and consumers of carrion and dung. Flies and mosquitoes undergo complete metamorphosis, and some have aquatic larvae.

Although there has never been a complete inventory, there are hundreds of species of fly on St. Martin. In many cases they are very difficult to identify, as there may be dozens of similar species, requiring microscopic analysis by an expert to make exact determinations.

Flies have one pair of wings. Instead of a second pair, they have halteres, which resemble a stick with a ball at the end. In flight, they function like gyroscopes to help make flies more maneuverable in the air.



Hoverfly (*Allograpta* sp.)

Hoverflies are members of the family Syrphidae. Many of them are bee mimics, which makes them less appealing to potential predators.



Dengue Fever Mosquito (*Aedes aegypti*)

This mosquito can be identified by the lyre-shaped markings on its thorax. On St. Martin, this species is a vector for Dengue Fever, which is caused by the dengue virus.



Elongated Hoverfly (*Ocyrtamys parvicornis*)

St. Martin has several species of hoverfly with elongated abdomens which superficially resemble tiny dragonflies.



White-spotted Moth Fly (*Clogmia albipunctata*)

Also known as a **Shower Fly**, the larvae of these tiny flies live in water, including shower drains. Their hairy wings give them a moth-like appearance.



Hoverfly Larva (Family Syrphidae)

Many hoverfly larvae are predatory, often eating aphids. This larva is eating **Oleander Aphids** (*Aphis nerii*), which may be poisonous to other insects.



Green Soldier Fly (*Hedriodiscus* sp.)

These flies may be found feeding at flowers. Their larvae are aquatic, and feed on algae. Soldier flies comprise the family Stratiomyidae.



Bearded Robber Fly (*Proctacanthus* sp.)

Robber flies are large, predatory flies from the family Asilidae. They often catch their prey in flight, and use their piercing mouthparts to inject toxins and enzymes.



Flower Fruit Fly (*Tomoplagia* sp.)

This member of the fruit fly family Tephritidae is laying eggs inside a flower bud. Its larvae will probably consume either the flower or the fruit as it grows.



Long Legged Fly (*Condylostylus* sp.)

These small flies are typically shiny green or gold in color and are often seen sunning themselves on leaves. When approached, they are quick to move to a nearby leaf.



Sourbush Seed Fly (*Acinia picturata*)

Another fruit fly, there are several similar species on St. Martin. Each has a different pattern on its wings.



Stilt-legged Fly (*Hoplocheiloma* sp.)

These odd looking flies from the family Micropezidae are found in shady forest areas. They feed on dung, and possibly rotting fruit.

GRASSHOPPERS, CRICKETS AND KATYDIDS

The family Orthoptera includes grasshoppers, crickets and katydids. This family is most easily recognized by their strong hindlegs, which are adapted for jumping.

Orthopterans undergo incomplete metamorphosis, also known as hemimetabolism. Their life cycle is from egg to nymph to adult. Unlike insects that undergo complete metamorphosis, nymphs are typically somewhat similar to the adult, but often without wings. Each time they shed their exoskeleton to grow (known as molting), they look more and more like adults.

Many species from this family make noise by rubbing their legs or wings together. They hear through a tympanum that is located on their legs or their abdomen.



Green Bush Cricket (*Carylla* sp.)

The crickets of this genus are endemic to the West Indies. A nymph is pictured. Adults are green with yellow lines down the sides of their wings.



Slant-faced Grasshopper (*Orphulella punctata*)

These small grasshoppers are highly variable in their coloration, ranging from green to brown to gray.



Scaly Cricket (*Cycloptilum* sp.)

These small crickets often hide in abandoned spider retreats. They have small wings that do not cover their abdomen. Their body is covered with tiny scales.



Bird Grasshopper (*Schistocerca pallens*)

There are multiple species from this genus on St. Martin. In other places, these grasshoppers may swarm under the right conditions. When swarming, they are known as locusts.



Cave Cricket (*Amphiacusta* sp.)

These crickets are found in caves, and also on the forest floor, where they hide beneath rocks during the day. The Caribbean has many endemic species from this genus.



Tree Cricket (*Oecanthus* sp.)

These small crickets may be identified by the calls that they make and by small anatomical details. They typically call from the underside of a leaf.



Leaf Mimic Katydid (*Phoebolampta caeruleotergum*)

This species was first discovered on St. Martin. This photo shows a very young nymph. Even at hatching, nymphs essentially resemble adults.



Forest Katydid (*Nesonotus tricornis*)

These large katydids are native to the Caribbean, and often hide in tree hollows during the day.



Leaf Mimic Katydid (*Phoebolampta caeruleotergum*)

Larger nymphs of this species have red markings that help give them the appearance of a diseased or damaged leaf,



Broad-tipped Conehead (*Neoconocephalus triops*)

This species may be brown or green and makes a very loud, rasping call at night. They primarily feed on grass seeds. They are named after the cone on the tip of their head.



Leaf Mimic Katydid (*Phoebolampta caeruleotergum*)

Adults are very similar in appearance to another local species, *Microcentrum triangulatum*, but have distinctive red markings, primarily on their legs.

TRUE BUGS

The family Hemiptera is incredibly diverse, including scale insects, aphids, planthoppers, cicadas and true bugs. Their primary distinguishing feature is a tube-like proboscis. They use it to pierce their food and suck out liquids.

Hemipterans are very diverse, and many groups within this family look very different from other members. Many scale insects, for example, remain stationary on their plant hosts for most of their life. Most hemipterans feed on plant sap, but some are predators, primarily hunting other insects.



Oleander Aphid (*Aphis nerii*)

These aphids are common on **Oleander** (*Nerium oleander*) and **Apple of Sodom** (*Calotropis procera*), toxins derived from these plants make them poisonous to some predators.



Stellate Scale (*Vinsonia stellifera*)

These star-shaped scale insects are found in many parts of the world and considered an agricultural pest. Like many scale insects, they are covered in a waxy protective coating.



Cicada (Family Cicadidae)

Cicadas are well-known for their buzzing call. Cicada nymphs live underground, typically feeding from tree roots, before eventually emerging and molting into adults.



Ensign Coccid (Family Ortheziidae)

This species exhibits sexual dimorphism. The adult male looks like a tiny fly with a tuft of hair coming from its abdomen. Females are scale-like with a white waxy covering.



Green Leafhopper (Family Cicadellidae)

There are at least 20,000 species of leafhopper worldwide and perhaps dozens on St. Martin. Closely related to cicadas, they feed on plant sap.



Cixiid Planthopper (*Bothriocera* sp.)

These small planthoppers are quite common on St. Martin and can be found on a variety of plant hosts.



Franciscan Pond Skater (*Limnogonus franciscanus*)

This water strider from the family Gerridae is found on the surface of fresh water in streams and roadside ditches. They use the surface tension of water to support themselves.



Treehopper (Family Membracidae)

Also known as **Thorn Bugs**, the upper side of the thorax is often enlarged, sometimes into a thorn-like spine or a variety of other shapes as a form of camouflage.



Mini Water Cricket (*Microvelia* sp.)

These tiny water striders are often found in swarms on puddles or the surface of wells or other standing water. They hunt insects and other small invertebrates.



Citrus Flatid Planthopper (*Metcalfa pruinosa*)

These planthoppers are somewhat rectangular in shape and covered in a waxy coating. This species will feed on practically any plant. Larvae are covered in waxy filaments.



Shore Bug (Family Saldidae)

These small bugs are typically found on mudflats near our salt ponds, where they hunt insect prey. Pictured above is a nymph. It may be white because it is freshly molted.



Tomato Stink Bug (*Arvelius albopunctatus*)

Stink bugs are from the family Pentatomidae, and get their name from their ability to emit foul-smelling liquids when disturbed. This species is a pest of many crops.



Paula's Giant Shield Bug (*Piezosternum subulatum*)

Resembling a giant stink bug with a tiny head, this species is from the family Tessaratomidae. The upper side is green, while the underside is bright orange.



Tomato Stink Bug (*Arvelius albopunctatus*)

Hemipteran eggs are often laid in clutches, arranged in geometric patterns. Nymphs often live together to reduce predation. Nymphs often differ in color and pattern from adults.



Torrid Jewel Bug (*Pachycoris torridus*)

A number of hemipterans protect their young and eggs. This species is from the family Scutelleridae, and the last section of the thorax forms a shield covering the rest of the body.



Rice Stink Bug (*Oebalus pugnax*)

This stink bug is a pest of rice and grain crops, but also feeds on wild grasses. Its body is more elongated than many pentatomids. The nymph is shown here.



Burrowing Bug (*Amnestus pusio*)

Members of the family Cydnidae, these bugs burrow in soil and suck liquid from plant roots. They are also able to fly and may be attracted to lights at night.



O'Neal's Leaf-footed Bug (*Leptoglossus stigma*)

The leaf-footed bugs of the family Coreidae can be identified by the enlarged tibia on their hind legs, which may look leaf-like.



Broad-headed Bug (*Megalotomus* sp.)

Nymphs of this species seem to be ant mimics, as can be seen in the photo. Adults are brown and elongated. This species is from the family Alydidae.



Squash Bug (*Anasa scorbatica*)

This coreid is often seen on **Squash** or **Melon** plants (family Cucurbitaceae), and is seen here laying eggs.



Milkweed Bug (*Oncopeltus asulicus*)

From the family Lygaeidae, these bugs feed primarily on seeds. They store toxins from their plant hosts to make them unpalatable to predators.



Soto's Longhorned Bug (*Chariesterus gracilicornis*)

This small coreid is endemic to the West Indies. The colorful nymph is shown here. Adults are light brown and have an elongated body.



St. Andrew's Cotton Stainer (*Dysdercus andreae*)

Large congregations of this bug are often found on the fallen fruit of the **Portia Tree** (*Thespesia populnea*). They are from the family Pyrrhocoridae.



Slender Grass Bug (*Trigonotylus* sp.)

From the family Miridae, this bug probably feeds on grasses, but some members of the family are predators.



Thread-legged Bug (Subfamily Emesinae)

These slender predators resemble stick insects with praying mantis-like front legs. They are hunters, and some species specialize in hunting spiders.



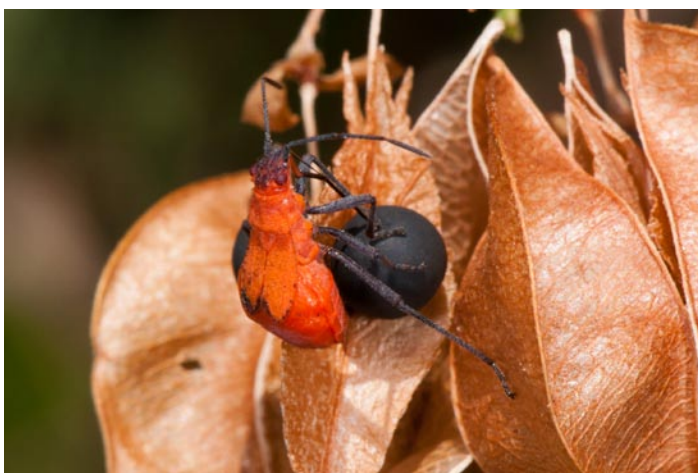
Brown Lace Bug (*Teleonemia sacchari*)

Lace bugs, from the family Tingidae, are usually tiny and often have extended, elaborately shaped forewings. There are at least four species on St. Martin.



Ambush Bug (*Lophoscirtus* sp.)

These predatory insects from the subfamily Phymatinae often wait on flowers to capture insects. They are known to capture prey up to ten times their size.



Soapberry Bug (Family Coreidae)

Soapberry bugs feed on the seeds of **Soapberry Vines** (Family Sapindaceae). Our species has yet to be identified, and may be entirely new to science.



Milkweed Assassin Bug (*Zelus longipes*)

From the family Reduviidae, these bugs are often seen as beneficial insects because they hunt many species of insect that are considered pests.

TERMITES AND COCKROACHES

It was recently determined that termites, formerly order Isoptera, are actually members of the cockroach order Blattodea. One way of thinking about it is that termites are social cockroaches. Termites and cockroaches also have similar symbiotic bacteria that help them digest wood and other foods. Although it is accepted that termites are a subgroup of cockroaches, there is currently no consensus on how to rearrange the taxonomy to account for this.

While most people are familiar with the large, introduced cockroach species that are commonly seen in homes, St. Martin also has a number of small, native species that are quite beautiful.



Brown Tree Cockroach (*Caribblatta* sp.)

This small cockroach is typically found in trees. The genus is named after the Carib people, Amerindians from the Lesser Antilles.



Termites (Epifamily Termitoidae)

There may be more than a dozen species of termite on St. Martin, but they are very difficult to identify. They play an important role in breaking down dead wood.



Gem Cockroach (*Euthlastoblatta* sp.)

These small, arboreal cockroaches are often found beneath the bark of trees. Several species from this genus are endemic to the Caribbean.



Australian Cockroach (*Periplaneta australasiae*)

One of several large, introduced cockroaches that are similar in appearance, the nymph is shown here. The **American Cockroach** (*P. americana*) is also common here.



Gem Cockroach (*Euthlastoblatta* sp.)

This cockroach nymph is white because it has recently molted. As the new exoskeleton hardens, it will also become darker until it reaches normal coloration.

DRAGONFLIES AND DAMSELFLIES

Dragonflies and damselflies comprise the order Odonata. They are predatory insects that undergo incomplete metamorphosis and have aquatic nymphs. Fossil insects very similar to the dragonflies of today date back to approximately 300 million years.

Dragonflies are exceptionally fast and maneuverable in flight, and at rest they typically hold their wings out or slightly down. Damselflies are typically smaller and weaker in flight, and they fold their wings above their back when resting.

Nymphs of both species are aquatic predators. They have a hinged lower jaw (labium) that can be thrust forward to capture prey.



Great Pondhawk (*Erythemis vesiculosa*)

This large, green dragonfly is found from the southern US through much of South America. It prefers to lay eggs in still water, including temporary pools.



Rambur's Forktail (*Ischnura ramburii*)

Our most common damselfly, males have a green thorax with blue on the abdomen, while females may be orange, drab green or similar in color to males.



Roseate Skimmer (*Orthemis ferruginea*)

Females of this species are a rusty orange color, while males are pinkish-red. Many dragonfly species have different coloration between the two sexes.



Dragonfly Larva (Suborder Anisoptera)

Dragonfly larvae may be found in ponds, roadside ditches and other freshwater resources. They feed on aquatic insects, tadpoles and other small aquatic animals.



Antillean Dragonlet (*Erythrodiplax justiniana*)

This dragonfly is endemic to the Caribbean. The female is shown above. Males have a pale gray abdomen and the inner part of the hindwing is black.

OTHER INSECTS

While many insect orders have hundreds of species on St. Martin, representatives of several less diverse orders are collected here. We may have, for example, only one known stick insect (order Phasmatodea) and perhaps a handful of flea species.

A few orders are omitted entirely, including the **Thrips** (order Thysanoptera) and the **Silverfish** (order Thysanura). There are also surely a number of **Lice** (order Phthiraptera), including many species that are bird parasites.



Citrus Barklouse (*Pseudocaecilius citricola*)

These tiny insects from the order Psocoptera have fossil ancestors dating back over 250 million years. They typically feed on fungus or decomposing plant matter.



Antillean Stick Insect (*Clonistria* sp.)

This is a nymph of the female, which is green. The species is currently undetermined, but many islands have endemic species of stick insect, so ours may only live on St. Martin.



Antillean Stick Insect (*Clonistria* sp.)

The males of our stick insect are brown. They are easier to find at night, and are often seen feeding on **Acacia** (*Acacia* sp.) trees.



Earwig (*Paralabella* sp.)

From the order Dermaptera, these insects have prominent pincers at the end of their abdomen. They are nocturnal and earwhigs may feed on insects or plants.



Pet Flea (*Ctenocephalides* sp.)

Fleas, order Siphonaptera, are mammal and bird parasites, sucking blood with piercing mouthparts. This genus includes the **Dog Flea** and **Cat Flea**, which arrived here with pets.



SPIDERS

Spiders are members of the order Araneae within the class Arachnida. They have two body segments, a cephalothorax, which is a combined head and thorax, and an abdomen. All spiders have eight legs and venom-injecting fangs known as chelicerae. Spiders have spinnerets on their abdomens, from which they extrude silk. Most spiders have eight eyes, although some have fewer.

Spiders are well-known for building webs, but not all spiders do this. Spiders may produce several different types of silk for different purposes, like web-building, lining a retreat or creating an egg sac to house their eggs.

While some spiders build webs to catch flying prey, spiders hunt in many different ways, actively hunting on the ground or on vegetation, sitting hidden on flowers to ambush insects coming for nectar, or building burrows or funnels and waiting for prey to walk by.

While spiders are fearsome hunters in the invertebrate world, the vast majority of species pose no harm to humans. Spiders typically avoid confrontation with humans as much as possible and only a handful of species have venom that is toxic enough to cause serious injury to a human.

Our understanding of spiders on St. Martin and in the Lesser Antilles is quite incomplete. Spiders are an incredibly diverse group of animals, and while there may be several hundred species on St. Martin, only a small percentage of those have been properly documented. Someone interested in doing so could probably go out and find a different species of spider on the island every day for a year.

This section includes less than half of the spiders I have photographed on St. Martin, but it does include most of the commonly seen species. Spiders are often adapted to specific types of habitat, such as scrub, forest, wetlands or caves. Many species are nocturnal, and may be found by hiking at night with a headlamp and looking for the glint of light reflecting in their eyes.

Developing a better understanding of spider diversity on St. Martin and the rest of the Caribbean may also help us understand the geological past of the islands themselves. Comparing spider diversity and ancestry from island to island and between the Caribbean and the Americas may shed new light on how and when the islands were formed and their geological relationship with the Americas.

TARANTULAS

Tarantulas are spiders from the family Theraphosidae. They are typically hairy and some are quite large. They are a subgroup of the infraorder Mygalomorphae. Most spiders are members of the infraorder Araneomorphae, which is sometimes known as the “true spiders.”

Tarantulas have downward-pointing fangs that do not cross, unlike most spiders. They also have fewer silk-producing spinnerets than most spiders, and do not produce piriform silk, which is used by araneomorphs to build webs. Many species have a patch of urticating hairs on their abdomen. Tarantulas may use their legs to flick these barbed hairs at a potential predator, where they may embed in the skin or eyes and cause irritation.

Tarantulas are typically nocturnal hunters and may prowl the forest floor or climb trees to find prey. During the day, many tarantulas live in burrows or under rocks. According to S.J. Kruythoff, tarantulas are “also in country dwellings” on St. Martin.



Hairy Tarantula (*Cyrtopholis* sp.)

This species is relatively large. Its leg span may be more than 10 cm. The male is pictured above, and is unusually hairy. Our species may be undescribed and endemic to St. Martin.



Hairy Tarantula (*Cyrtopholis* sp.)

This female was killed by a **Tarantula Hawk** (*Pepsis rubra*), but also managed to kill the wasp. The pair were found locked in a deadly embrace.



Little Tarantula (*Holothele* sp.)

These tarantulas are 2–3 cm in length and are common under rocks, where they build a retreat lined with silk. There may be multiple species from this genus on St. Martin.



Hairy Tarantula (*Cyrtopholis* sp.)

Juvenile *Cyrtopholis* are pink with a black spot on the abdomen, and are found in burrows beneath stones.

ORB-WEAVING SPIDERS

Spiders in the families Araneidae (orb-weaving spiders) and Tetragnathidae (long-jawed orb weavers) typically build round webs to catch their prey. These families include some of the most commonly-seen spiders on St. Martin.

Depending on the species, orb weavers may build their web during the day or at night. They often build a new web daily and may eat the old web to recycle the silk for use in the next day's web.

These two families are members of the same superfamily and all have eight eyes.



Spiny-backed Orbweaver (*Gasteracantha cancriformis*)

This species comes in a variety of colors and patterns of black, red, white and yellow. They build a dashed line into the outer edge of their webs so birds can avoid flying into them.



Green Mangrove Spider (*Alpaida dominica*)

This small orb weaver is usually seen on mangrove leaves during the day. It is also found on St. Barts and other Caribbean islands.



Tropical Orb Weaver (*Eriophora ravilla*)

This large spider builds its web each night, but leaves a single strand of silk from one bush or tree to another during the day. At one end of the strand, the spider can be found hiding.



Night Orb Weaver (*Eustala* sp.)

These spiders build their webs at night and hide on plants during the day. There may be several species from this genus on St. Martin, and some may be new to science.



Shanty Orb Weaver (*Metepeira compsa*)

This species builds a retreat, or hiding place, in its web, constructed of silk and debris such as dead leaves. Often, many of these spiders are found in the same tree or area.



Silver Argiope (*Argiope argentata*)

One of the most commonly seen spiders, they build large webs, primarily in scrub areas. The center of the web often has a zig-zag X, which is thought to attract prey to the web.



Greater Leucauge (*Leucauge argyra*)

Primarily found in shady forests, this spider is similar to the **Royal Leucauge**, but is larger and has a smooth abdomen.



March's Seven-sided Orb Weaver (*Gea heptagon*)

This relatively uncommon orb weaver has small bumps in the front of its abdomen. It also uses silk to create a pattern in the center of its web.



Long-jawed Spider (*Tetragnatha* sp.)

These spiders have long legs, bodies and mandibles. They are most common in mangrove wetlands, and their population increases when midges and other prey are common.



Royal Leucauge (*Leucauge regnyi*)

This spider is named after the "crown" of bumps on its abdomen. Shown mating, the male deposits sperm in the abdomen of the female using an appendage called a pedipalp.



Red Mountain Spider (*Alcimosphenus licinus*)

This beautiful spider has brilliant red and black coloring and an unusually shaped abdomen. Widespread in the Caribbean, it is the only known species in its genus.

JUMPING SPIDERS

Jumping spiders, family Salticidae, do not use webs to catch their prey. They hunt on foot, pouncing once they are close enough to their prey. To do this, they need excellent vision and depth perception, so they have two large, forward-facing eyes, in addition to their other eyes. Jumping spiders are also generally quite small, usually less than 1 cm in length.

Many jumping spiders also have intricate courtship dances that are unique to each species. Because two spiders will view each other as potential prey, it is important to establish that a potential mate is both the right species and receptive to mating. Males will dance in a specific fashion, and females will note their interest by crouching, and/or producing positive vibrations.



Green Forest Jumper (*Lyssomanes* sp.)

There is at least one species of bright green jumping spider that can be found on leaves in the forest. They typically have long legs compared to other jumping spiders.



Antillean Jumping Spider (*Hentzia antillana*)

The male, pictured above, has brown and tan coloration, a thin line down the back of the cephalothorax and elongated mandibles.



Eight-spotted Jumper (*Beata octopunctata*)

This small, stocky jumping spider is typically found on foliage in scrub areas and is named after the pattern on its abdomen.



Jumping Spider (*Hentzia* sp.)

This female has captured a fly much larger than she is. Jumping spiders are poorly understood in the Lesser Antilles and probably many species remain undiscovered.



Iridescent Jumping Spider (*Anasaitis* sp.)

Often seen on the forest floor, these tiny spiders may wave their pedipalps in circular motions, perhaps to attract prey. Common near rotting fruit, they may prey on fruit flies.

OTHER SPIDERS

St. Martin is probably home to hundreds of spider species, potentially including many endemic species. Research is currently underway to identify many of our spider species and those in the rest of the Lesser Antilles.

A number of species from several different families are featured on the following pages, including most of the larger spiders that are likely to be noticed on the island.

As with other invertebrates, some identifications are difficult to make from photographs, particularly when multiple species are very similar in appearance. Due to the relative lack of research on St. Martin, it is also possible that some of these spiders are new species that have not been described yet, but closely resemble known species.



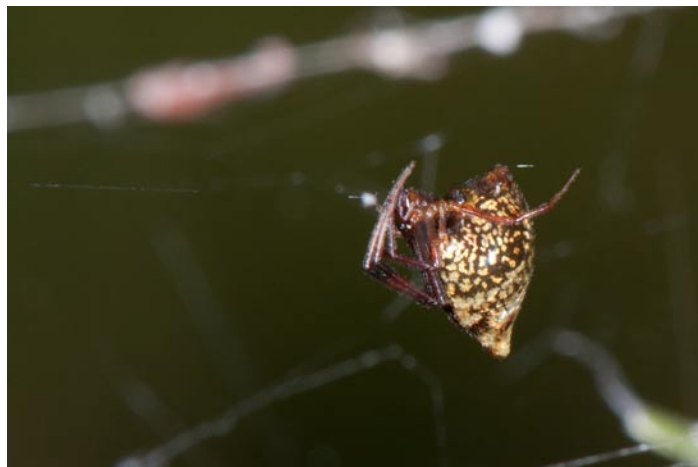
Brown Widow (*Latrodectus geometricus*)

A relative of the **Black Widow** (*Latrodectus* spp.) from the family Theridiidae, its venom is highly toxic, but its bite is typically minor. It has an orange hourglass on its underside.



Green Lynx Spider (*Peucetia* sp.)

From the family Oxyopidae, these spiders typically wait near flowers to ambush bees, wasps and butterflies that come to feed on nectar.



Dewdrop Spider (*Argyodes* sp.)

These tiny spiders are kleptoparasites. They live in the webs of larger spiders, where they steal prey. They may help keep the web clean when stealing prey too small for their host.



Flower Crab Spider (*Misumenops asperatus*)

A crab spider from the family Thomisidae, these spiders have coloration that matches the flowers where they ambush prey, primarily on **Bellyache Bush** (*Jatropha gossypifolia*).



Leaf Spider (*Theridion* sp.)

These small spiders are typically hidden on leaves or in palm fronds. They may be colonial, and even cooperate to catch larger prey. Shown with spiderlings and an empty egg sac.



Yellow Sac Spider (*Cheiracanthium inclusum*)

A nocturnal predator, this spider spends its days in a retreat made by folding a leaf into a pouch with silk. From the family Miturgidae, the male is pictured here.



Giant Crab Spider (*Olios* sp.)

Another nocturnal hunter that spends its day in a retreat made from foliage, these large spiders typically have an orange or tan abdomen.



Leaf Tent Spider (*Homalometa nigritarsis*)

This spider makes a silken tent on the surface of a leaf and hides inside. It lays eggs inside the tent in parallel rows. Just above the tent, it builds a small web to catch prey.



Souliga Wall Crab Spider (*Selenops souliga*)

Discovered on St. Martin, this species is named after the Ar-wak name for St. Martin, Souliga. These spiders are incredibly flat and are typically found beneath stones or bark.



Cryptic Crab Spider (*Tmarus* sp.)

This spider, from the family Thomisidae, typically sits hidden on twigs in the forest. Its front pairs of legs are very long and are probably used to snare prey.



St. Vincent Wolf Spider (*Hogna sanctivincenti*)

This wolf spider, from the family Lycosidae, is often seen in wetlands. Females will carry their egg sacs. It is possible that this spider is a very similar, possibly undescribed species.



Ghost Spider (*Hibana* sp.)

Despite being in a different family, Anyphaenidae, these spiders are very similar in appearance to the **Yellow Sac Spider**. The female is shown here.



Humped Spider (*Zosis geniculatus*)

Also known as the **Grey House Spider**, it is from the family Uloboridae, sometimes known as the hackled orb weavers. On St. Martin, it is common in abandoned buildings.



Long-legged Tropical Spitting Spider (*Scytodes longipes*)

This spider, from the family Scytodidae is often found in homes. They capture prey by spitting a fluid on them that is both sticky and venomous.



Cellar Spider (*Smeringopus pallidus*)

Typically found in dark areas, these spiders bob back and forth when threatened. It is shown here carrying a mass of spiderlings who are clinging to the empty egg sac.



Brown Spitting Spider (*Scytodes fusca*)

The fluid that is spit by these spiders is a combination of venom and liquid spider silk, and they typically attack from 1-2 cm away.



Short-bodied Cellar Spider (*Physocyclus globosus*)

Commonly found in homes, this spider from the family Pholcidae is also found in caves. It is shown here holding a sac of eggs.



OTHER INVERTEBRATES

This section includes a number of arthropod (phylum Arthropoda) classes, including centipedes, millipedes, crustaceans and non-spider arachnids. It also includes terrestrial and freshwater gastropods (class Gastropoda), the snails and slugs. One flatworm (class Turbellaria) is also included on this page.

Not featured in this section are earthworms (subclass Oligochaeta) and roundworms (phylum Nematoda).

Earthworms burrow in soil and consume decaying organic matter, like dead leaves. They improve soil in several ways: breaking down organic matter and soil particles, making the nutrients more readily available to other organisms, and leaving tunnels in soil that allow air and water to penetrate the soil.

Some roundworms, like soil nematodes, also live underground, feeding on plants, bacteria, fungi or other nematodes. Many species are also internal parasites and may have plants, animals or even humans as their host.



Hammerhead Slug (*Bipalium kewense*)

This species is not actually a slug, but a predatory flatworm. Thought to be native to Southeast Asia, it is now found in many parts of the world, probably transported with ornamental plants. Although many species of flatworm are internal parasites, such as flukes and tapeworms, this species hunts earthworms. On St. Martin, it may be found beneath rocks and debris. They can also be seen traveling along the wet ground after a rain storm.

NON-SPIDER ARACHNIDS

The class Arachnida includes a variety of eight-legged arthropods. Best known are the spiders, which make up a little less than half of known arachnid species.

Non-spider arachnids on the island include scorpions (order Scorpiones), whip spiders (order Amblypygi), harvestmen (order Opiliones) and mites and ticks (subclass Acari). Some, like the harvestmen, look much like spiders. Others are quite different in appearance, although the underlying anatomy is similar. Scorpions, for example have very large pedipalps with chelae (claws) at the ends. The last six segments of a scorpion's abdomen form its tail and stinger.

S. J. Kruthoff noted that the whip spider is “found in dark underground places” and the scorpion's sting is “painful, but not dangerous.”



Harvestman (Order Opiliones)

Although common on Saba, I have only encountered one opilionid on St. Martin, seen once on the slope of Pic Paradis. They are harmless and look much like a spider.



Lesser Antillean Bark Scorpion (*Centruroides barbudensis*)

This scorpion is several centimeters in length and is typically found beneath tree bark. They are active at night and will fluoresce under ultraviolet light.



Hard Tick (Family Ixodidae)

This family of ticks includes many livestock and pet parasites as well as carriers of some diseases that affect humans. Females attach to hosts and become engorged with blood.



Lesser Antillean Whip Spider (*Phrynus goesii*)

Fearsome-looking, but harmless and without venom, their forelegs are very long and thin and are used as sensory organs. Their pedipalps are like spiny pincers used to grab prey.



Phoretic Mites (Family Macrochelidae)

There are two types of mites on this scarab beetle. The smaller ones on the body are probably in the family Macrochelidae, and are using the beetle as transportation to a food source.

CENTIPEDES

Centipedes are arthropods from the class Chilapoda. They have many segments and one pair of legs on each body segment. The name centipede comes from the latin for “hundred feet.” In reality, most centipedes have far fewer legs, although some may have over 300.

On St. Martin, many of our species are from the order Scolopendromorpha, which includes our giant centipedes and a number of smaller relatives. The order Geophilomorpha is also represented on the island. These centipedes are typically smaller and have more segments.

Also included in this section is a so-called **Garden Centipede**, which is a member of the class Symphyla. It is technically not a centipede, but members of this class are related to centipedes and resemble them in many ways.



Vietnamese Giant Centipede (*Scolopendra subspinipes*)

These centipedes may reach 20 cm in length and have powerful venom. Their bite is extremely painful and may cause swelling, fever and even necrosis at the site of the bite.



Garden Centipede (Class Symphyla)

Similar to centipedes, these small, translucent arthropods typically have six pairs of legs when young and add a pair each time they molt until they have twelve as adults.



Vietnamese Giant Centipede (*Scolopendra subspinipes*)

Giant centipedes are nocturnal hunters and they may be found climbing trees and bushes at night in search of prey.



Soil Centipede (Order Geophilomorpha)

These centipedes are typically small, with over 27 body segments and live in soil. These centipedes are completely blind. We do not know which species live on St. Martin.



Vietnamese Giant Centipede (*Scolopendra subspinipes*)

This juvenile giant centipede is brightly colored and quite small. It may take several years for this centipede to reach adult size.

MILLIPEDES

Millipedes comprise the class Diplopoda, and they are arthropods with many body segments and two pairs of legs per segment. Ancestors of today's millipedes are probably one of the first animals to venture onto land over 400 million years ago.

Millipedes are detritivores, which means they feed on decaying organic material, primarily dead plants. They typically move slowly and often curl into a ball when threatened. Some are also able to emit noxious liquids or gasses to deter predators. They are often found under rocks, in leaf litter or beneath tree bark.

S. J. Kruythoff refers to the millipede as the **Christmas Worm**, although it is unclear if this name is used for a specific type, or millipedes in general.



Brown Millipede (*Trigoniulus lumbricinus*)

This species seems to be most common under tree bark and in decomposing wood.



Flatback Millipede (*Asiomorpha coarctata*)

These centipedes have paranota on their backs, which are flat extensions on each segment. They are from the order Polydesmida, the most diverse millipede order.



Flatback Millipede (*Asiomorpha coarctata*)

The immature flatback millipede is typically pale in color, but essentially the same shape as the adult. This species is from Asia and has been introduced to the Caribbean.



Rusty Millipede (*Trigoniulus corallinus*)

This red millipede is native to Southeast Asia, but has been introduced in many areas, including the Caribbean. It is shown here in a defensive spiral, protecting its legs and belly.



Bumblebee Millipede (*Anadenobolus monilicornis*)

This millipede is dark with yellow bands and is native to the Caribbean and South America.

CRUSTACEANS

The subphylum Crustacea includes many marine animals, but there are also terrestrial and freshwater species here.

Unlike many invertebrates, humans have a close relationship with crabs. We may see them as food, bait or a bad omen. Two dark-colored species of land crab, the **Black-backed Land Crab** (*Gecarcinus lateralis*) and the **Black Land Crab** (*G. ruricola*) are called **Jumbie Crab** on St. Martin. A jumbie is a spirit or demon, and because of this association many St. Martiners do not eat them. However, this aversion is not universal. According to one account, these crabs were very common in Terres Basses, and when the first villas were being built in that area in the early 1960s, construction workers from Guadeloupe were quite surprised that these crabs were not eaten on St. Martin. Needless to say, the Guadeloupeans were happy to take advantage of this situation.



River Prawn (*Macrobrachium* sp.)

Found in ravines that have running water at least part of the year, their larvae require brackish water, which may explain how they survive during periods when ravines are dry.



Pillbug (Family Armadillidiidae)

Pillbugs and their cousins the **Sowbugs** (Family Porcellionidae) are terrestrial isopods. Although they live on land, they have gills and need moisture to breathe.



Caribbean Hermit Crab (*Coenobita clypeatus*)

A common sight on the island, this crab can scale trees and climb hills, but deposits its eggs in the ocean. It is also known as the **Soldier Crab**.



Rock Slater (Family Ligiidae)

These isopods typically live on rocky seashore areas. Like **Pillbugs** and **Sowbugs**, they primarily eat decaying organic material.



Sally Lightfoot Crab (*Grapsus grapsus*)

This colorful crab lives on rocky seashores, primarily eating algae. Their name comes from their surprising speed and agility.



Ghost Crab (*Ocypode quadrata*)

Named for its pale color, these crabs live in burrows on sandy beaches where they forage at the water's edge. They enter the water regularly to moisten their gills.



Mangrove Tree Crab (*Aratus pisonii*)

This small crab lives on and around mangrove trees, and mangrove leaves typically make up the majority of its diet. It may be various shades of brown with a mottled pattern.



Marsh Fiddler Crab (*Uca pugnax*)

Most common on the sandy areas and mudflats surrounding our salt ponds, these crabs dig burrows into the sand or mud and retreat into them when approached.



Jumbie Crab (*Gecarcinus lateralis*)

These small crabs are almost entirely terrestrial, but they do return to the sea to breed. Primarily nocturnal, they dig burrows or hide beneath stones or other debris during the day.



Burger's Fiddler Crab (*Uca burgersi*)

When feeding, these crabs use their small claw to bring food from the ground to their mouth, this gives the appearance of fiddling, with the large claw serving as the fiddle.



Great Land Crab (*Cardisoma guanhumi*)

A favorite food of the Amerindians who lived on St. Martin, remains of the crab are common at archaeological sites. This tasty crab is still eaten throughout the Caribbean.

MOLLUSKS

The snails of St. Martin were the subject of much study during the early history of the island. Collectors during the 19th century included the French naval officers M. Beau, Edouard Auguste Marie and Hippolyte Pierre Mazé, Danish apothecary Hendrik Johannes Krebs, French priest P. Kohlmann, Swedish geologist Per Theodor Cleve and, of course, Dutch physician Hendrik van Rijgersma. During the 20th century, collectors included American malacologist Paul Bartsch, Dutch biologist Pieter Wagenaar Hummelinck and Hendrikus Eduard Coomans.

Due to the work of these collectors and others, the mollusk fauna of St. Martin is quite well documented and specimens from St. Martin may be found in museum collections around the world.



East African Land Snail (*Achatina fulica*)

These large snails are a widespread invasive species. They may have arrived here in 1995, via eggs attached to materials imported for rebuilding after Hurricane Luis.



Virgin Nerite (*Neritina virginea*)

This snail is native to St. Martin, and may be found in running fresh water as well as brackish ponds and mangrove wetlands. The intricate pattern on their shell is highly variable.



Garden Zachrysia (*Zachrysia provisorio*)

This medium-sized snail is native to the Caribbean. The shell varies from tan to dark reddish-brown and usually has light colored speckles, particularly on the inner whorls.



Red-rimmed Melania (*Melanoides tuberculata*)

These freshwater snails are common in roadside drainage ditches and water-filled ravines. Native to Africa and Asia, they have been introduced to much of the world.



Two-toned Awl Snail (*Opeas pumilum*)

These tiny snails have elongated shells that are yellowish-cream near the opening and dark at the tip. They are typically found in moist leaf litter or under debris.



Striped Tree Snail (*Drymaeus elongatus*)

This snail has a white or tan shell with stripes in various shades of brown. The number and intensity of the stripes varies. In dry conditions they attach themselves to tree trunks.



Striped Helicininid (*Helicina fasciata*)

These small snails are found in forest areas, and may be a mix of white, yellow, orange, red and brown. Their closest relatives are aquatic snails rather than other land snails.



West Indian Bulimulus (*Bulimulus guadalupensis*)

This species is probably native to the southern islands of the Lesser Antilles, but is now widespread throughout the Caribbean and is quite common on St. Martin.



Caribbean Leatherleaf (*Sarasimula plebeia*)

This unusual looking slug is typically found under debris. Adults may wrap their body around a clutch of eggs, perhaps to keep the eggs from drying out.



Goat Mountain Snail (*Adamsiella crenulata martinensis*)

Common in leaf litter and under debris, even in dry areas, this subspecies was described from specimens collected in 1929 on First Stick Hill near Grand Case.



Glittery Tree Slug

I have been unable to identify this slug, which can be found foraging at night in the forest. Several centimeters long, tiny light speckles give it a glittery appearance.

ST. MARTIN HABITATS

Though small, St. Martin has a varied landscape, providing a number of different habitats for our fauna. A more technical term for habitat is biotope. The primary difference is that biotope refers to a type of environment shared by all the plants and animals that live there, while a habitat may refer to the environment preferred by a single species of animal. In practice, the terms are essentially interchangeable.

Thorny Scrub

Much of St. Martin is covered with thorny scrub, which may also be referred to as **Shrubland**, **Scrubland**, **Scrub** or **Brush**. Here this type of habitat covers much of our undeveloped land, from sea level to our hilltops. The vegetation is typically a mix of trees, shrubs and grasses, and usually quite dense.

This type of habitat is common in relatively dry areas, and it may also occur temporarily during the natural process of reforesting land cleared by humans. Brush fires may also prevent scrub areas from developing into forests. On St. Martin, it probably exists for all of these reasons.

Acacias (*Acacia* sp.) and other thorny plants are very common in our scrub. They may lose their leaves during dry periods to avoid losing moisture. Grasses may also die down to the roots for the same reason.

Thorny scrub is a preferred habitat for many of our seed-eating birds, like the **Lesser Antillean Bullfinch** and **Black-faced Grassquit**. The **Anguilla Bank Anole** is also common in these areas.

Savanna

The term savanna is thought to come from the Arawak term

for grassland. It is similar to scrub, and the terms may be used interchangeably to some degree. Here I use the term to describe areas that are primarily grassy. On St. Martin, these are often areas used for pasture, where shrubs have been cleared by people or unable to grow because the young shoots are eaten by livestock. In most cases, a few large trees, often **Tamarind** (*Tamarindus indica*), are left to provide shade for livestock during the heat of the day.

While very similar to scrub, savanna is a valuable habitat for some species. It is an ideal hunting ground for the **American Kestrel**, because it allows them to spot potential prey from a distance. Well-grazed areas are often foraging and nesting grounds for **Killdeer**, because it allows them to see potential predators from a distance. **Cattle Egrets** also feed in these areas, often alongside grazing animals.

Dry Coastal Forest

This habitat is similar to scrub, but is dominated by small trees which form a canopy, shading the ground and limiting the amount of smaller plants that are able to grow. The undeveloped area between Cul-de-sac and Anse Marcel is the best remaining example of this type of forest on the island.

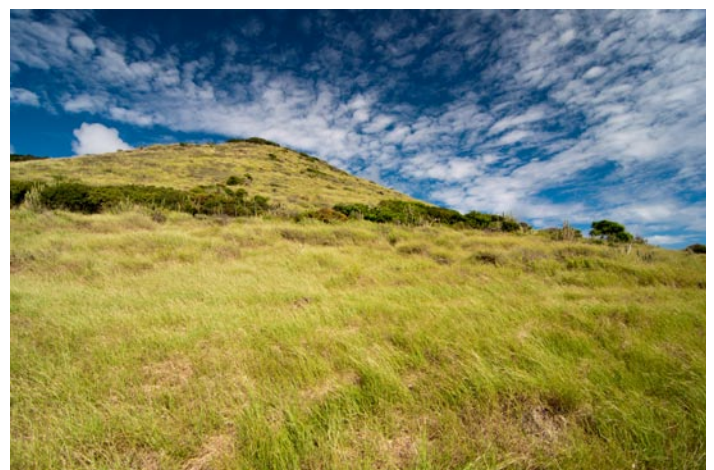
Dry Broadleaf Forest

Small areas of this type of forest are found primarily along ravines, particularly those running down from Pic Paradis toward Colombier and Rambaud. On St. Martin, these are probably secondary forests, meaning they have regrown after the land was cleared for sugarcane production in the 18th and 19th centuries.

These areas are dominated by tall trees, which create a high canopy. Lack of light leaves the understory (the area beneath the canopy) relatively open. The ground is typically covered



Thorny scrub covers the hills surrounding Bell Valley. The mix of trees, shrubs and smaller plants can be quite dense and difficult to penetrate.



Savanna at near Pointe Blanche is interspersed with areas of scrub. Grazing by free roaming goats often plays a role in keeping grassy areas open.

in a thick layer of leaf litter. The canopy also helps retain moisture in the understory, although it is still much drier than a rainforest. On St. Martin, large fruit trees, such as the **Mango** (*Mangifera indica*) are often part of our forest along with native tree species.

This habitat is ideal for treefrogs and is the preferred habitat of the endemic **Bearded Anole**. Birds like the **Pearly-eyed Thrasher** and many of the migratory warblers overwintering here prefer this habitat. It is also the best place to find many invertebrates, including the **Striped Helicinid**, the **Forest Katydid**, and the **Leaf Tent Spider**.

Mangrove Wetlands

Mangrove wetlands, also known as **Mangrove Swamps**, can be found around our ponds and lagoon. Four species of tree form our mangrove wetlands, the **Red Mangrove** (*Rhizophoria mangle*), **Black Mangrove** (*Avicennia germinans*), **White Mangrove** (*Laguncularia racemosa*) and **Buttonwood** (*Conocarpus erectus*). Each of these trees has adapted to live under wet, salty conditions.

Red mangrove often lives in water, and extends prop roots from its trunk to give it more stability. Their roots are also specially-adapted to avoid taking in salt. Black mangroves have root-like structures called pneumatophores that rise up into the air and allow the tree to obtain oxygen even when its roots are surrounded by water or mud.

Mangroves are a key nesting area for egrets, herons and other birds. They are also a favorite habitat of the introduced **Green Iguana**. Many terrestrial crab species are found in mangrove areas, and mangroves themselves are a host plant for a number of insects, including the **Mangrove Buckeye**.



Coastal vegetation transitions into dry coastal forest in the undeveloped northeastern corner of the island.



Huge buttress roots provide stability for tall trees like the **Silk Cotton Tree** (*Bombax ceiba*) in dry broadleaf forests. A full canopy leaves the understory shady and open.



A brush fire on the hill behind French Cul-de-sac sweeps quickly through dry grass. Larger trees and shrubs often survive such fires. Old stone walls may also act as firebreaks, limiting the spread of brushfires.



Mangroves line Étang du Cimetière in Grand Case. The lagoon and most salt ponds have some areas of mangrove forest along their borders, although in many cases they are much reduced from their original size.

Below the surface of the water, mangrove roots provide a protected nursery for baby fish, spiny lobsters and a variety of other marine creatures. Anemones, oysters and other invertebrates may live attached to mangrove roots. Many of these animals are food for wading birds, herons and other animals.

Mangroves along the shore also protect the island from storms and high seas, providing a buffer between the land and the sea. Mangroves and the animals that live in their roots also trap nutrients that would otherwise flow out to sea, keeping the sea clear so corals are able to grow. They can even expand the land area, gradually trapping sediments and their own fallen leaves to produce soil.

Mudflats

Mudflats can be found around many of our salt ponds, varying in size depending on the water level. The mud is rich in nutrients, providing food for a variety of mollusks, crustaceans and other invertebrates. These animals are the primary food source for most wading birds, as well as predatory insects like tiger beetles. Mudflats are also a common nesting ground for birds like the **Black-necked Stilt** and **Killdeer**.

Because they are salty and sometimes submerged, there is little vegetation on mudflats. Plant species found on and at the edges of mudflats include various salt-tolerant grasses, **Shoreline Purslane** (*Sesuvium portulacastrum*) and **Glasswort** (*Salicornia ambigua*). Caterpillars of the **Obscure Skipper** typically feed on salt-tolerant grasses.

Sandy Beaches

Sandy beaches may look relatively barren, but in their natural state, they are home to a number of plants that are especially adapted to sandy, salty conditions. Common examples include the **Sea Grape** (*Coccoloba uvifera*), **Beach Morning**

Glory (*Ipomoea pes-caprae*) and **Coconut Palm** (*Cocos nucifera*). Many nutrients also come from the sea, as bits of algae, sea grass and dead marine animals wash up on the beach. This provides food for **Ghost Crabs**, amphipods and insects. Much as on mudflats, these invertebrates are a food source for shorebirds.

Sandy beaches provide nesting areas for sea turtles, and insects like the **Crazy Beach Bee** and **Sand Wasp**. The flowers and fruits of plants growing on the beach provide food for a variety of insects and birds.

Cliffs and Rocky Shoreline

These areas may be inhospitable to many creatures, but they are an important resource to some. Cliffs offer some protection from predation, so they are an important nesting area for tropicbirds. Rocky shorelines, with their tide pools, are a rich source of food for birds like the **American Oystercatcher** and **Laughing Gull**. Crabs like the **Sally Light-foot Crab** spend all their time on rocky shorelines near the water's edge.

Caves

Many animals are particularly well-adapted to life in caves. Vegetation is typically minimal, because there is little or no light available, but large amounts of nutrients are introduced to caves in the form of bat excrement. Many insects are adapted to feed on bat excrement, or the fungus that grows on it. In turn, cave dwelling predators, like spiders feed on those insects. There are also parasitic flies from the family Streblidae who feed on bat blood and are generally only found on bats or in bat roosting areas like caves.

Freshwater Habitats

St. Martin has limited fresh water, but a variety of freshwater



Mangrove seedlings are growing on an area of mudflat at Salines de l'Aéroport in Grand Case. The size of the mudflat varies with the water level of the pond.



Rocky shorelines, like this one at Grandes Cayes, offer intertidal foraging areas for shorebirds and other animals.

habitats, often small, can be found. Running water is available seasonally or after rains in the ravines running down our hills and in roadside drainage ditches. Wells and ponds made for livestock are other sources. Man-made freshwater environments may be deliberate, like old bathtubs filled with water for livestock, or accidental, like old tires or containers filled with rainwater. Freshwater habitats can also be incredibly small, like the reservoirs of water that collect in the base of bromeliads.

These freshwater resources provide drinking water for many animals, but they also serve as habitat for many aquatic animals. Freshwater fish like the **Mountain Mullet** are the most obvious, but many insects are also aquatic for some or all of their life, including dragonflies, mosquitoes and some beetles.

Offshore Rocks and Islets

These areas are typically ecologically similar to areas on St. Martin. Creole Rock is like a small chunk of rocky shoreline, and Pinel Island contains scrub, savanna and sandy beaches. They may play a unique role, however, due to their isolation. Offshore rocks like Pelican Key are popular breeding sites for seabirds, because they are relatively free of predators, a key feature for birds that nest on the ground. Lack of introduced predators like the mongoose has also allowed some reptile species to survive on islets in the Caribbean after they were extirpated from their main islands.

Urban Areas

While urban areas may be inhospitable to some species, others survive, or even thrive, in the modern urban environment. For animals that are comfortable around humans, our waste is a rich source of food. A number of doves and other birds like the **Bananaquit** gladly take partake in our leftovers. The **Velvety Free-tailed Bat** will take up residence in roofs or attics, and the **House Gecko** takes full advantage of the insects attracted to artificial lights. Exotic plants used in landscaping may be important host plants for various insects.

Some species, like the **Cuban Brown Anole**, are known to thrive in urban areas, and may find it easier to establish themselves there, than in natural environments where well-established native species already dominate. The **Anguilla Bank Ameiva**, is thought to be somewhat restricted to urban areas because the mongoose, a key predator, avoids them.



This cave at Billy Folly is illuminated by sunlight coming through a small hole in the ceiling of the cave. Other chambers of this cave system are totally dark.



During rainy periods, small streams run down the bottom of ravines or guts. During the dry season almost all of these streams disappear entirely.



Offshore rocks like Pelican Key provide relative safety for nesting seabirds. While some introduced predators, like rats, are capable swimmers, the mongoose avoids water and has very poor endurance when forced to swim.

ISLAND ECOLOGY

Island ecology is the study of plant and animal communities on islands, how these communities form, and how the species interact with each other and their surroundings. Island ecosystems are typically very different than those on the continents, because islands are often small, and isolated from large landmasses. For example, they typically have fewer species, but a higher percentage of endemic species.

Colonization

Colonization is the process by which animals arrive on an island, either from a continent or another island. St. Martin is an oceanic island, meaning it is not geologically part of a continent and has never been connected to a continent.

Natural colonization happens when animals arrive on an island by natural means. Birds, bats and flying insects are the most effective colonizers, because they can fly, either directly from a continent, or by gradually colonizing from island to island. Some freshwater fish are able to colonize islands because their eggs and larvae live in the sea and are brought to islands by ocean currents.

Natural colonization by other animals may depend on chance events. A natural raft of vegetation, like a tree that is knocked down and sent out to sea during a hurricane, can bring new species to an island. Although this is often cited as a possible mechanism for animal dispersal, it has rarely been documented. It is possible that an event like this might happen on St. Martin only once every hundred or thousand years. Over millions of years, however, it could account for the arrival of many species.

Plants arrive to islands in many of the same ways. Some have floating, saltwater-tolerant seeds that can travel on ocean currents. Others may arrive as seeds attached to birds. Seeds that are sticky or spiny may be caught on the feathers or skin of birds, and small seeds may be stuck in mud on the feet of birds. Some seeds that are very small or have airborne dispersal mechanisms may travel on air currents as well. The timing of plant and animal colonizations may be very important. Animals arriving on an island without a suitable plant host will not survive, and plants arriving on an island without a suitable pollinator may not be able to reproduce.

Humans began introducing animals to St. Martin during prehistoric times, with the arrival of Amerindians. These introductions have accelerated through colonial times and into the modern day as more people and cargo arrive from other parts of the world. A few introductions are deliberate, such as the introduction of the **Mongoose**, but the vast majority are accidental. During colonial times, many species may have arrived with the seedlings of agricultural crops. Today, the most significant source of introduced species may be the

importation of ornamental plants for landscaping.

Speciation

Islands are often home to unique animal species that are found nowhere else. On St. Martin, these include several lizards and an unknown number of insects, spiders and other invertebrates. Speciation, the evolution of new species, happens on islands for several reasons.

For non-flying animals, once they have colonized an island, they are typically isolated from other populations. Because there is no genetic exchange, the animals isolated on an island may begin to diverge from populations elsewhere. Eventually, once they are sufficiently distinct from the source population, they may remain a separate species, even if additional colonization events occur.

Isolation is a mechanism that facilitates the development of new species on islands, but adaptation is the reason why it happens. Over time, plants and animals will adapt, or evolve, to succeed in new or changing conditions. A lizard arriving from an island with more rainfall and forest, may adapt to become more drought and heat resistant on St. Martin.

The unique assembly of fauna on each island also influences adaptation and speciation. For example, St. Martin has fewer insect-eating birds than one would find on a continent, and had no mammalian predators before humans arrived. These factors left an ecological niche that was largely occupied by lizards. With more available prey and fewer predators, lizards adapted to take advantage of the ecological situation.

Adaptive Radiation

When a single species colonizes a new area with unfilled ecological niches, it may diversify into multiple species, each exploiting one available niche. This process is called adaptive radiation. The most famous example is the diversity of finches on the Galapagos Islands, which helped inspire Charles Darwin's theory of evolution. A single colonizing species, finding a lack of competition on these islands, evolved into many species, each adapted to different habitats and food sources.

In the Caribbean, anole lizards are another example of adaptive radiation. Both of St. Martin's native anoles are descended from a common ancestor that probably came to the Lesser Antilles from the Greater Antilles. Our species are different sizes, so they can take advantage of different sized prey, and they also prefer different habitats, scrub versus forest. This diversification allows them coexist on the island while occupying more area and utilizing more available food resources than a single species.

Island Biogeography

The field of island biogeography began with an attempt to

understand the factors that determine species richness (the number of species) on any given island. The first hypothesis was that the total number of species is primarily determined by the distance between the island and the land mass that is the source of colonizing species and the size of the island. An island close to a continent would have more frequent colonizations, while an island that is small would have more frequent extinctions. Extinction events would be more common on a small island because available habitat is smaller and populations would be more vulnerable to a drought or a storm that temporarily disrupts their food source.

In theory, a new island with no plants and animals would gradually be colonized by more and more species until the rate of extinctions equalled the rate of new colonizations, creating a stable number of species. In practice, things are much more complicated. A small island with a varied landscape, for example, might support greater diversity than a larger island with fewer types of habitat to colonize. The direction of ocean currents may make islands easier or harder to colonize.

Today, concepts of island biogeography are used to study more than just islands. Ecologically speaking, any habitat that is isolated from similar habitats is a type of island. A patch of forest surrounded by farmland is effectively an island in many ways. Even on St. Martin, we have ecological islands, like our caves. Although the caves in Terres Basses and Billy Folly may be equally suitable for various insect and spider species, the species actually present are different in the two caves because it is difficult to colonize from one area to the other.

Theories of island biogeography are often used in conservation biology to help determine the most effective ways to preserve species and ecosystems. They may be used to determine the best size and shape of land set aside for nature reserves. A single large reserve could potentially support more diversity than a number of small reserves. The idea of using natural corridors to link habitat islands also comes from island biogeography.

Vulnerability

Island fauna are particularly vulnerable to both natural events and human impact. On islands, droughts or natural disasters like hurricanes and volcanic eruptions can wipe out entire species. Habitat destruction can have a greater impact on islands where habitats may be smaller to begin with. Introduced species can be particularly damaging on islands. An introduced predator may drive native species to extinction because they are not adapted to defend themselves. Other species may overrun an island because they have no natural predators there.



Seabirds, like these **Brown Boobies**, were probably some of the first animals to colonize St. Martin. (Photo by Marc Petrelluzzi)



Endemic species, like the **Bearded Anole**, evolved from ancestors that arrived by natural dispersal. Isolated on St. Martin, they adapted to the landscape and to competitive pressure, gradually becoming a distinct species.



Even a small brush with a hurricane can temporarily defoliate trees and disrupt the food supply of animals that depend on leaves or nectar.

BIOLOGY ON ST. MARTIN

Our understanding of the biology of St. Martin has been acquired gradually over the last four centuries. There have been important contributions from both scientists and non-scientists, from St. Martin, the Caribbean and other countries around the world. Much like migratory shorebirds, many stopped briefly to do research and collect specimens. A few, finding themselves in a new environment with unoccupied scientific niches to colonize, became great contributors to the study of our fauna.

The First Accounts

Histoire naturelle et morale des îles Antilles de l'Amérique, translated into English under the title *The History of the Caribby Islands* by Charles de Rochefort was published in 1658. Little is known about de Rochefort, but he may have been a pastor sent to minister to French-speaking Protestants in the Caribbean. Although it includes only three paragraphs about St. Martin, in just two sentences he tells us many interesting things about the island:

There are also ponds of salt water, which run up far into the Land, in which are taken an abundance of good fish, especially Sea-Tortoises. There are in the Woods Wild-Swine, Quists, Turtles, and an infinite number of Parrots.

While the presence of doves (quists) is unsurprising, his account tells us with some certainty that the **Red-footed Tortoise** was living on the island essentially at the beginning of the colonial era. His remark about parrots is quite astounding, and makes one wonder what other species may have been on St. Martin at that time.

Jean-Baptiste Labat, better known as Père Labat, was a French priest and polymath who lived in and travelled the Carib-

bean between 1693 and 1706. In addition to his missionary work, he wrote in detail about Caribbean biology, life in the early colonial era and his interactions with the Carib people. He describes a 1705 visit to St. Martin in the book *Nouveau Voyage aux îles Françaises de l'Amérique*, published in 1722. Although he does not describe the wildlife of St. Martin, his description of the colonies helps us understand the population and the extent of agriculture during this period.

Dr. Hendrik Elingsz van Rijgersma

Dr. van Rijgersma was a Dutch physician, appointed by the government of the Netherlands to provide care to the recently liberated slaves on St. Martin. He arrived in 1863, and died on the island in 1877. Although he never published a scientific paper, his field work was incredibly important to our understanding of the biology of the island.

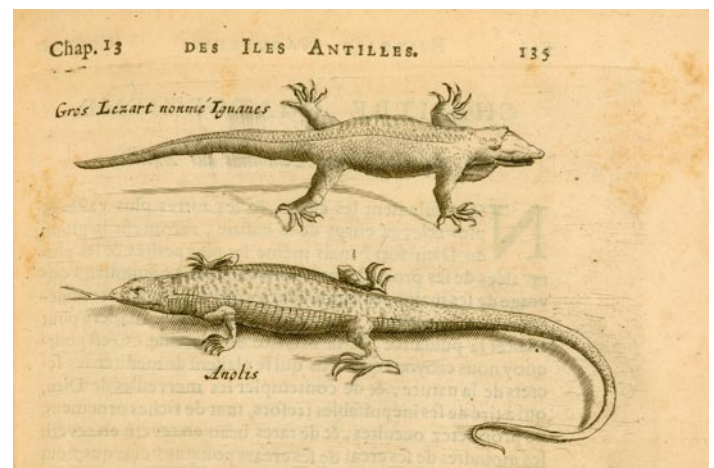
Dr. van Rijgersma was an avid shell collector, beginning in his childhood. We don't know if his interest in shells inspired him to apply for his post in St. Martin, but he did purchase tropical shells from sailors when growing up.

While on St. Martin, he made extensive biological collections, including shells, birds, reptiles, insects, plants and fossils. Many of his specimens are in museum collections to this day, in a variety of institutions in Europe and the United States. In some cases he traded biological specimens for scientific equipment or shells from other parts of the world. He also painted beautiful watercolors of both shells and plants.

Dr. van Rijgersma corresponded with many scientists around the world, including fellow malacologist (mollusk scientist) Hendrik Johannes Krebs, paleontologist E.D. Cope and professor Pieter Harting from Utrecht University in the Netherlands. On St. Martin, he was friends with Father Kohlmann,



Lesser Antillean wildlife as depicted by 17th century engraver Pierre Vander Aa, complete with flying dragon. Today, reports of flying dragons are assumed to be rum-induced.



An **Iguana** and an **Anole**, as pictured in *Histoire naturelle et morale des îles Antilles de l'Amérique* by Charles de Rochefort, 1658. (Courtesy of the John Carter Brown Library at Brown University)

a French priest and entomologist who was a former science teacher.

Fossils collected by van Rijgersma on Anguilla were used to describe the extinct **Blunt-toothed Giant Hutia** (*Amblyrhiza inundata*) which was endemic to the islands of the Anguilla Bank. The **Leeward Island Racer** (*Alsophis rijgersmaei*) was also described from specimens collected by the doctor, and the species was named after him by E.D. Cope:

Six specimens were sent to the Academy [of] Natural Sciences by Dr. H. E. van Rijgersma of that island. I dedicate this species to him in recognition of his labors endeavoring to lay a basis for the complete zoology of that island.

Most recently, a specimen collected by van Rijgersma was used to describe the **St. Martin Skink** (*Spondylurus martinae*) in 2012.

Dr. van Rijgersma died on March 4th, 1877, and was survived by his wife and seven children. He was buried in the Dutch Reformed Cemetery, which is now known as the Cul de Sac Cemetery. An inventory of his property done after his death, listed four pine cases of shells, valuing the empty cases at \$8 and the shells as “not valued.” In retrospect, this appraisal was highly flawed, as his contributions to science, though rarely recognized, were priceless.

20th Century Science

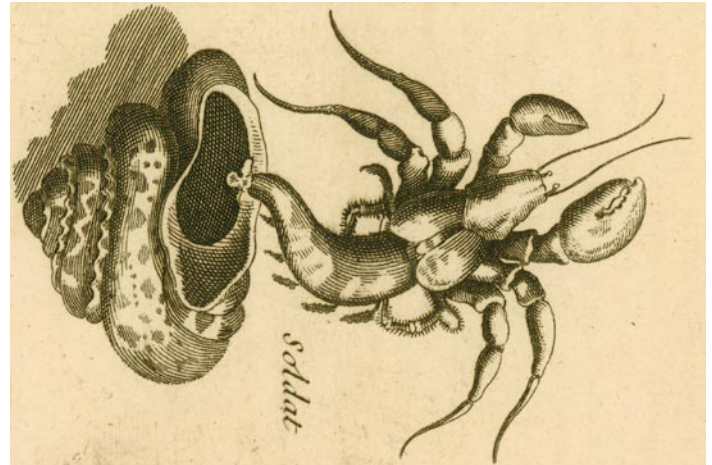
During previous centuries, local collectors typically sent specimens to museums where they were studied. During the 20th century, biologists began to do more field work in the Caribbean themselves. As the century progressed, interest in the unique biology of these islands increased and they became popular locations to study island biogeography and evolutionary biology. At the same time, local naturalists continued to play an important part in researching and documenting the biology of the island.

The most extensive documentation of St. Martin wildlife in the first half of the 20th century was done by Evert Stephanus Johannes Kruythoff. Born on St. Martin in 1893, Kruythoff was a teacher, and lived on St. Martin, Saba and St. Eustatius. His 1938 book, *The Netherlands Windward Islands and a Few Interesting Items on French St. Martin*, contains a lengthy chapter on the flora, fauna and marine life of the three islands.

Although better known as a historian, Kruythoff's observations regarding the animals of St. Martin are quite illuminating. As a resident of the island, his understanding of seasonal and long-term changes in animal populations is incredibly useful. He also recorded the local names of many animals,



Birds and nesting sea turtles from *Histoire generale des Antilles habitees par les Francois* by Jean Baptiste Du Tertre, 1667. (Courtesy of the John Carter Brown Library at Brown University)



A **Soldier Crab**, illustrated in *Nouveau voyage aux isles de l'Amerique* by Jean Baptiste Labat, 1742. (Courtesy of the John Carter Brown Library at Brown University)



The tombstone of Hendrick van Rijgersma sits beneath a large tamarind tree in the Cul de Sac cemetery. The marble top was set back in place by volunteers in 2009.

and how St. Martiners interacted with them. The most common relationship at the time was hunter and game.

A number of Dutch scientists visited St. Martin during the middle of the 20th century. Dr. Pieter Wagenaar Hummelink visited in 1949, 1955 and 1963, collecting a variety of animal specimens while on the island. He was one of the most influential biologists studying the Caribbean in the 20th century, editing the journal *Studies on the Fauna of Curaçao and other Caribbean Islands* for several decades. He published dozens of scientific papers, and specimens he collected were the basis for dozens more.

Dr. Karel Hendrik Voous was a Dutch ornithologist and author who visited St. Martin in 1952, collecting over 164 bird specimens and publishing a detailed article, “The Birds of St. Martin, Saba, and St. Eustatius” in Hummelinck’s journal.

During the second half of the century, the islands of the Caribbean gained interest as places to study evolutionary biology, island ecology and island biogeography. Advances in air travel, which helped spark the tourism industry, also made St. Martin and other islands more accessible to scientists.

Dr. James “Skip” Lazell visited St. Martin in 1963 and 1966 to study and collect lizards while working on his doctoral thesis. On the basis of his observations and the specimens he collected, he designated a new subspecies of anole on St. Martin, *Anolis wattsi pogus*, which was subsequently elevated to a distinct species found only on St. Martin.

In addition to his extensive contributions to Caribbean biology over the last several decades, Lazell had – and has – a mischievous wit. When I asked Dr. Lazell about the etymology of the name *pogus* in 2012, he told me this:

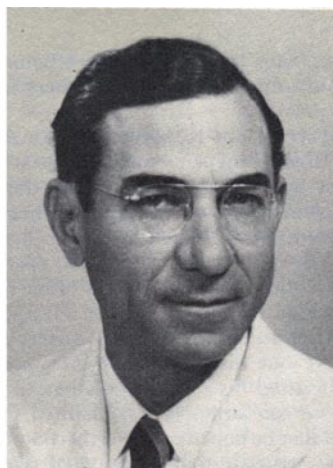
I just made up the name “pogus” for my favorite comic book character, Pogo the Possum. It all stemmed from a discussion at MCZ [Harvard’s Museum of Comparative Zoology] about scientific names and their meanings (or lack thereof). My point was that a name need not mean anything: “I’ll prove it to you! I’ll name my new *Anolis* ‘pogus’ and see if that passes peer review.” No one has ever asked before you, now!

Of course, the desire for meaning is strong, and subsequent researchers conjectured that the name came from the Greek for beard, pogos. They even went so far as to bestow upon the anole the common name **Bearded Anole**, reflecting this interpretation of *pogus*. It is difficult to say what has been proven or disproven by this turn of events.

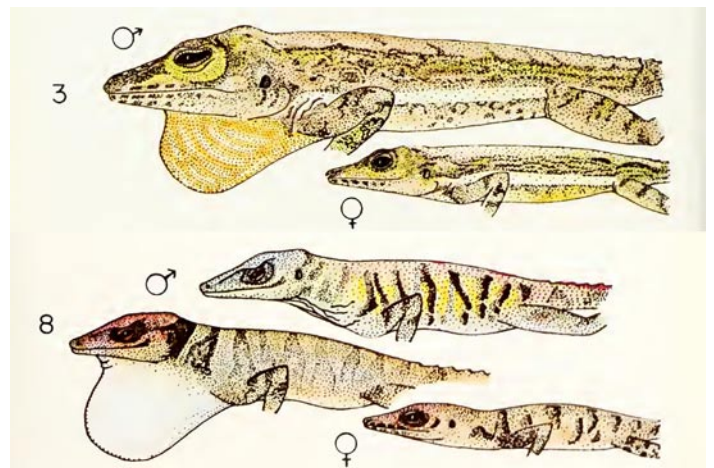
Although his work has taken him around the world, today Dr. Lazell does a great deal of research on Guana Island in the British Virgin Islands, just a day from St. Martin by sailboat.

In 1977, Andries Hoogerwerf published *Notes on the Birds of St. Martin, Saba and St. Eustatius*, a detailed account of the bird life of the island at that time based on visits to St. Martin in 1973, 1974 and 1975, as well as observations by his son, Henk Hoogerwerf and son-in-law, Anne de Haan. Their checklist included thirteen bird species not previously documented on St. Martin.

During the early 1980s, biologist and evolutionary ecologist Dr. Joan Roughgarden conducted a series of experiments on St. Martin and nearby islands that formed the basis for her book, *Anolis Lizards of the Caribbean: Ecology, Evolution and Plate Tectonics*. She used a combination of field experiments and computer modeling to develop a better understanding of foraging behavior, inter-species competition, coevolution,



The Netherlands Windward Islands, and the author, S.J. Kruythoff. His local and cultural knowledge of St. Martin’s fauna and how humans interacted with it was unmatched. (Photos from the collection of Will Johnson)



Illustrations of *Anolis gingivinus* (3) and *A. pogus* (8) by Skip Lazell. His field observations allowed him to capture the color variation of *A. pogus* often overlooked by other researchers. (Museum of Comparative Zoology, Harvard University)

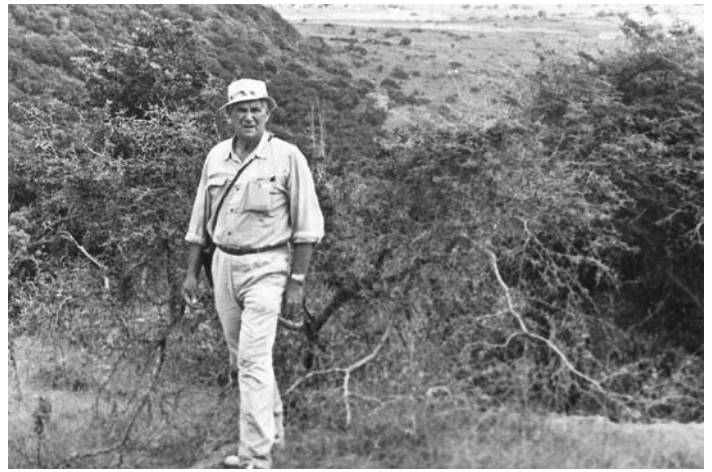
food webs and a variety of other phenomena. St. Martin was of particular interest because our two native *Anolis* species are unusually close in size, and therefore more closely in competition for food.

Biology on St. Martin Today

At the beginning of the 21st century, biological research on St. Martin continues. As always, new ideas, new technologies and new priorities are taking biology on the island in new directions. For example, advances in the technology and cost of DNA analysis have opened a new path to understanding animals and the evolutionary relationships between them. In 2012, S. Blair Hedges and Caitlin E. Conn described 24 new species of skink from the Caribbean based on a combination of molecular analysis and a review of physical characteristics. A new species endemic to St. Martin, **Saint Martin Skink**, was described from museum specimens alone, including one collected over 100 years ago by Dr. van Rijgersma.

Environmental and conservation concerns are also a pressing issue for contemporary biologists. Rapid development and introduced species are serious threats to native island species, many of which have not yet been described. Many of the groups working on the island today conduct scientific research as part of their conservation mission. The Réserve Naturelle de Saint-Martin conducts surveys of sea turtle nesting and wetland birds. The Nature Foundation St. Maarten also monitors sea turtle nesting. Environmental Protection in the Caribbean (EPIC) has done songbird banding, terrestrial bird counts and wetland bird counts on St. Martin for over 10 years, making these some of the longest-running projects of their kind in the Caribbean.

Looking towards the future, collaborations between organizations and individuals, scientists and enthusiasts, local researchers and visiting scientists and the various combinations thereof will undoubtedly advance our understanding of St. Martin's wildlife at a pace never seen before. At the same time, despite the new tools, from genetic analysis and radio tagging to digital photography and the online databases, the underlying process of learning remains remarkably unchanged. Bit by bit, from many sources, the picture of St. Martin's wildlife comes into focus, ever clearer and in more detail.



Andries Hoogerwerf in the field on St. Eustatius during his 1973 visit to the Dutch Windward Islands. His notes from three visits to the islands in the 1970s were published in 1977. (Photo by Henk Hoogerwerf)



Sharoni Shafir of Dr. Joan Roughgarden's team conducting an *Anolis* foraging behavior experiment to determine the maximum distance the lizard will chase prey of a given size. (Photograph by Joan Roughgarden)



One of the museum specimens used to describe *Spondylurus martinae*, a skink known only from St. Martin. (Photo by S. Blair Hedges, specimen courtesy of Museum of Comparative Zoology, Harvard University)

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For more information about the wildlife of St. Martin, and supplements to this book, visit www.sxmwildlife.com.



THE INCOMPLETE GUIDE TO THE WILDLIFE OF SAINT MARTIN

Discover the unique wildlife of the island of Saint Martin/Sint Maarten with vivid color photos and fascinating descriptions of its mammals, birds, reptiles, amphibians and invertebrates. This guide includes commonly-seen species, animals that are found only on this island, and many strange and unusual creatures that are seldom spotted anywhere.

Based on over three years of fieldwork, this entertaining book combines scientific, cultural and historical research to tell the story of the fauna of St. Martin, and their relationship with the island and its people. This revised and expanded second edition includes over 500 color photographs, and special sections about the types of habitats on the island, the island ecology, and the history of biological research on Saint Martin. It is the perfect introduction to the island's wildlife for people of all ages who are curious about the natural world around them.

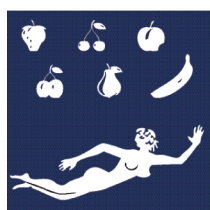
ABOUT THE AUTHOR

Mark Yokoyama is a naturalist, author and wildlife photographer living in Grand Case, Saint Martin. He holds a degree from Harvard University and is an avid entomologist – a lifelong passion that was sparked early in his childhood and led him to serve as president of the Oregon Entomological Society at the age of fifteen. In 2008, he co-founded the world's first extreme shallow snorkeling team, Les Fruits de Mer, and began exploring the shallowest waters of the world for pleasure and science.

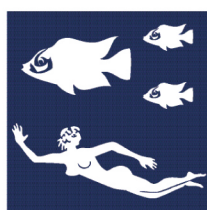


After moving to Saint Martin in 2009, he took to the hills to study and document the wildlife of the island. He published the first edition of this guide in 2010. His mission is to promote knowledge of the unique ecology of Saint Martin to its people and to the world – especially to children. He conducts ongoing field research on the island, and shares his wildlife expertise with school groups and the general public.

Visit www.sxmwildlife.com for additional publications and supplements to this guide.



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